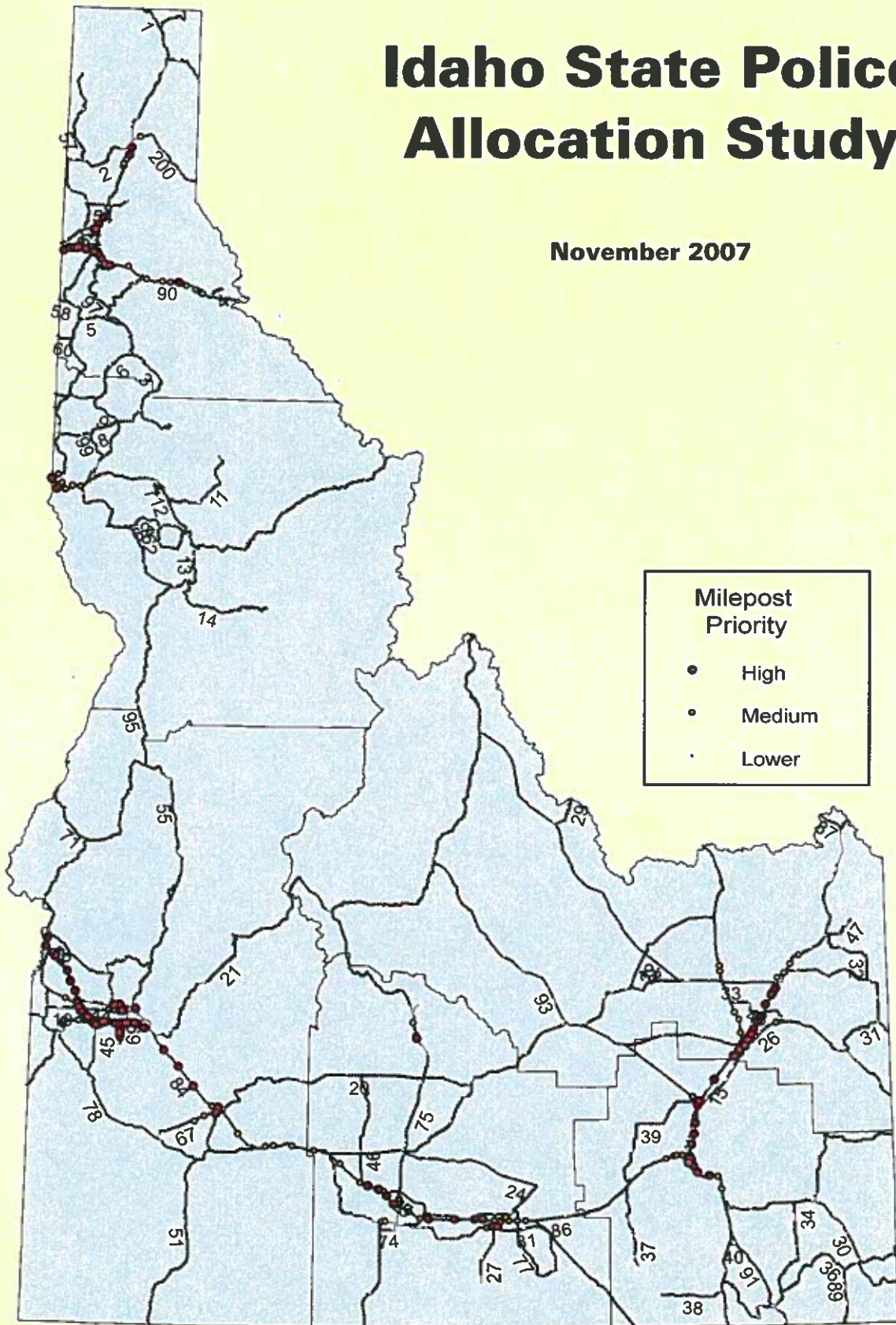


Idaho State Police Allocation Study

November 2007



Idaho State Police
Planning, Grants and Research

Executive Summary

In March 2007, the Idaho State Police Department of Planning, Grants and Research was selected to conduct a study on the appropriate number of police officers needed to patrol the federal and state highway systems of Idaho 24 hours a day. The primary responsibility of Idaho State Police patrol is to promote safety on state interstates and highways through proactive patrol. To have adequate coverage for calls for service, as well as assisting other agencies, it was determined it would be best to have a trooper pass by all state highway mileposts at least once per day. This added coverage would allow ISP troopers to respond to calls in rural areas where there is demand for help from the Idaho State Police, but where other agencies currently need to respond as our forces at times are not within range of the call.

After extensive information was collected from a variety of sources, the following report was formed. Data was broken into three different levels based on crashes, average traffic and calls for service per milepost in Idaho. Tier 1 roads are areas of the state where there are high amounts of traffic, crashes and other calls for service at most times of the day. Tier 1 roads need to have a trooper pass by every milepost once every 4 to 6 hours to promote maximum prevention of aggressive driving; therefore a minimum of 4 times a day, a maximum of 6. Tier 2 roads are areas that are busy only at certain times of the day and have less traffic volume, crashes, and other calls for service. Tier 2 roads need to have a trooper pass by each milepost every 8 to 12 hours; a minimum of two times per day and a maximum of three. Tier 3 roads have less traffic, few crashes or other calls for service, and need to be traveled once per 24 hours by troopers.

The average response time (dispatch time to time on scene) for Idaho State Police calls for service that are not officer initiated is currently over eighteen minutes. After using a Police Allocation Manual (PAM) formula developed by NorthWestern University addressing the number of officers needed per mile of freeway, it was estimated that ISP will need to hire 88 additional troopers to meet the demands of this new philosophy. Total trooper allocation for the State of Idaho would then reach 231, up from the current 143.

This initial study is a determination of the number of ISP patrol officers needed to allow for proactive patrolling on rotating 24 hour shifts on all Idaho state interstates and highways. Future studies will determine the added effect additional troopers will pose on investigations, communications, forensics, training, Human Resources, command staff, and extra facilities needed. More intense methodology regarding best allocation strategies will also be developed.

Methodology

In order to have appropriate data for this study, the following information was collected: crashes, average traffic, and calls for service per milepost for years 2004 through 2006. Unobligated time was also included by studying a sample of officers per region and determining officer average time spent on calls for service. After extensive clean-up and restructuring of the data, the information was examined and tier 1, 2 and 3 areas were established depending on the frequency of traffic, crashes, and calls for service. Information was analyzed using Statistical Package for the Social Sciences (SPSS) software, then plotted geographically using Geographic Information Systems (GIS) software. Crash and traffic flow information for all Idaho interstates and highways were obtained through the Idaho Transportation Department. Calls for Service were acquired through the Idaho State Police Computer Aided Dispatch (CAD) system.

Findings for this study were made after analyzing crashes on Idaho roadways, traffic on Idaho roadways and finally the types and frequency of calls for service. Depending upon where these incidents are most likely to occur, Tier 1, 2 and 3 roadways were established. Response time to various calls for service was also used as a measure of current ISP trooper performance. Calls for service used as a measure of response time included: motorist assist, abandoned vehicle, assist other agency, traffic hazard, general law, property damage crash, slide off, injury crash, unknown injury crash, fire call, hit and run crash, hazmat, fatal crash, and medical calls.

After establishing tier roads, an estimation was made for the average patrol speed possible through rural versus urban areas. For tier 1 roads an average patrol speed of 10 miles per hour was used (based on high traffic and high crash potential of area). Tier 2 roads were estimated to have an average patrol speed of approximately 35 miles per hour, and tier 3 roads were estimated to have a 55 mile per hour average patrol speed. Varying the speed and performance objective (number of times the trooper needs to pass a given point) in the equation in Figure 1 gave the number of troopers needed in a given area. All routes used in the equation are listed in the Appendix.

Figure 1. Police Allocation Manual Formula Addressing Number of Troopers Needed Per Milepost

$$N = \frac{HM \times HC}{7 \times PS \times SH \times PI}$$

N = Number of Troopers
HM = Highway Miles
HC = Hours of Coverage Per Week
PS = Average Patrol Speed (includes stationary patrol)
SH = Shift Length
PI = Performance Objective Patrol Interval

Findings

Crash Statistics

The trend in traffic collisions increased year by year from 1999 through 2005, then decreased between 2005 to 2006 by -14.2%. Crashes occur within city limits in urban areas more often than in rural. Table 1 shows that approximately 66.9% of all collisions from 1999 to 2006 occurred in urban areas.

Table 1. Comparison of Collisions by Roadway Classification: 1999-2006

	1999	2000	2001	2002	2003	2004	2005	2006
Total Collisions	25,076	26,241	26,090	26,477	26,700	28,332	28,238	24,225
Urban	14,503	15,463	15,752	15,676	15,841	17,101	17,504	14,810
Rural	10,573	10,778	10,338	10,801	10,859	11,231	10,734	9,415

Taken from Idaho Transportation Department Idaho Traffic Collision Reports: 2000-2006

Crash data indicates there are more crashes in winter months than in summer months. For the following information, only crashes occurring in areas patrolled by Idaho State Police (including all of interstates 15, 84 and 90, but excluding areas on state highways that occur within city boundaries as the city agency would be responsible to respond to this crash site).

- ❖ November through January are peak months for total number of crashes with December having the highest amount. Spring months of March through May have fewer crashes.
- ❖ Summer has highest numbers of fatal crashes. July, August, and September are peak months. Fatal crashes are much more resource intensive than other types of crashes requiring much more time involvement as well as number of officers needed to respond.
- ❖ Injury crashes are fairly evenly distributed, but slightly lower during spring months.
- ❖ Property damage crashes are highest in winter and fall. The lowest point for property damage crashes is in the spring.

Crashes happen less often on Sunday than any other day of the week (Chart 1). However, half (51.2%) of all fatal accidents occur on the weekend, including Friday through Sunday. Slightly less than half, or 45.0% of injury crashes and 43.4% of crashes involving property damage occur on the weekend.

Most crashes happen during the day (59.3%), however significant portions of traffic accidents at night occur when it is dark and there are no streetlights. Indicated by Chart 2, over one-third (36.2%) of fatal crashes occur when it is dark and there are no streetlights (Because of the rural nature of Idaho, significant portions of Idaho have no streetlights).

Crashes occur most often on 2 way roads where there is no divider present (Table 2). A larger proportion of fatal traffic accidents occur on 2 way roads with no divider than other types of crashes (61.8% compared with 50.8% of property damage crashes and 49.7% of injury crashes).

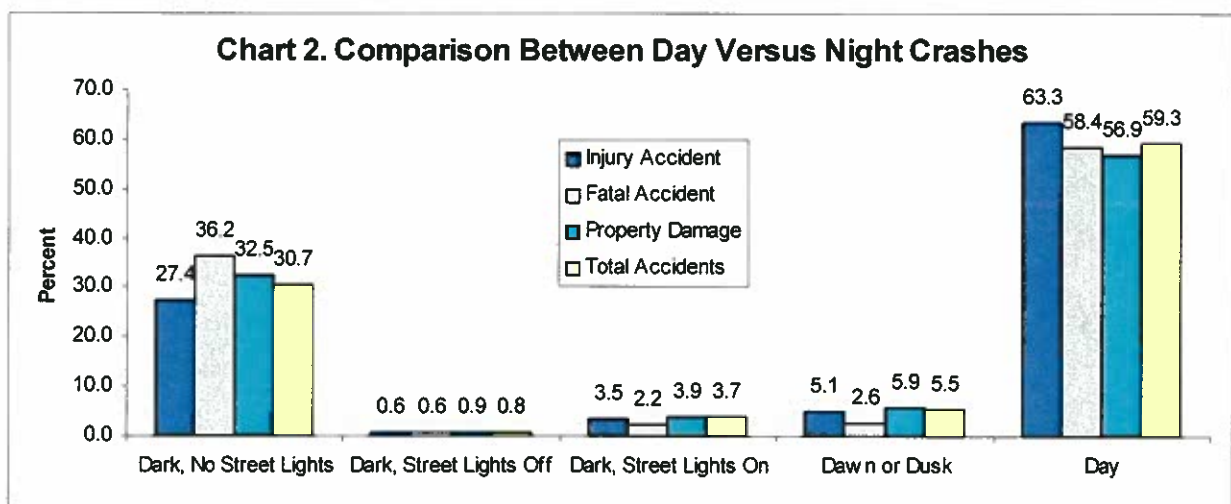
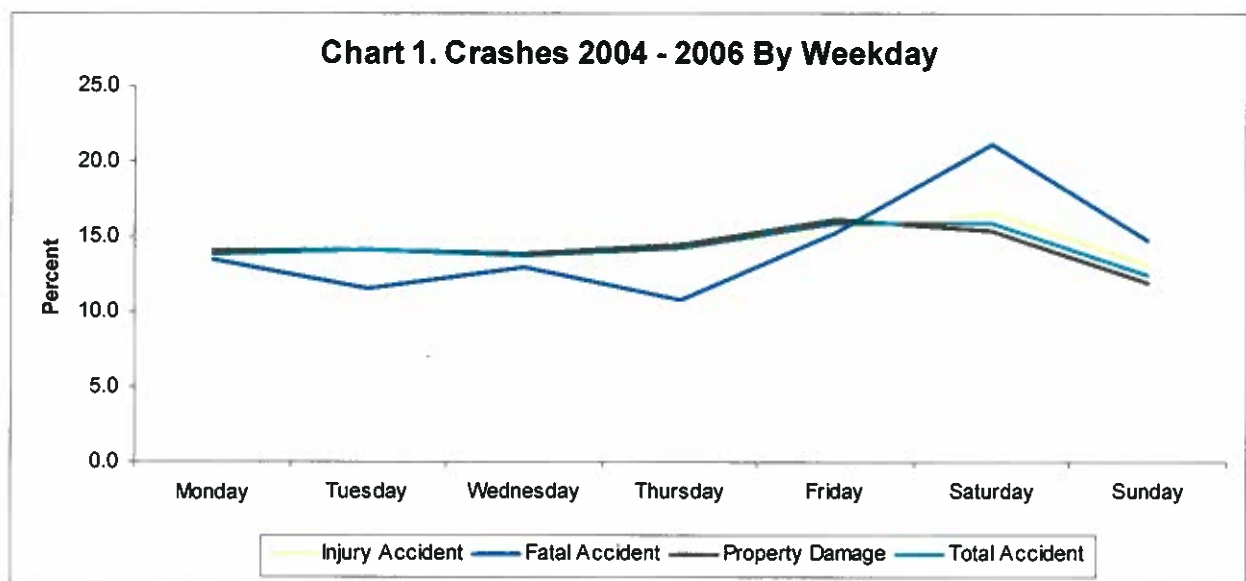
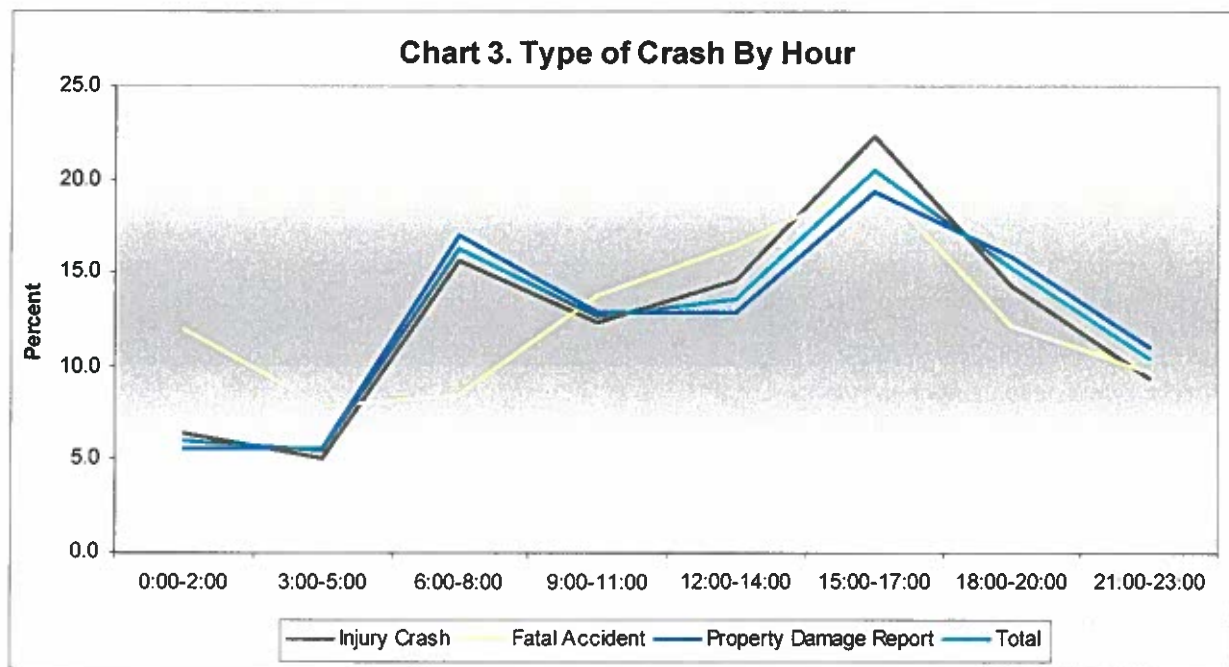


Table 2. Crashes 2004-2006 By Type of Road

Road Type	Property Damage		Injury Crash		Fatal Accident		Total*	
	N	%	N	%	N	%	N	%
1-Way	400	2.5	196	2.0	4	0.8	601	2.3
2-Way & 2 Double Yellow Painted Divider	1,365	8.6	877	8.8	52	10.4	2,297	8.7
2-Way And 2-Way Left-Turn Lane/Divider	782	4.9	558	5.6	17	3.4	1,357	5.2
2-Way And No Divider	8,677	54.8	5,643	56.7	304	60.8	14,645	55.6
2-Way And Raised/Depressed Divider	4,386	27.7	2,557	25.7	122	24.4	7,076	26.9
Ramp	164	1.0	80	0.8	1	0.2	246	0.9
Other	74	0.5	36	0.4	0	0.0	110	0.4
Total	15,848	100.0	9,947	100.0	500	100.0	26,332	100.0

*Total Crashes includes Non Reportable crashes

Crashes most often occur between 3:00 pm to 5:00 pm (15:00-17:00) in the late afternoon to early evening (Chart 3). This is, however dependent on the day. Saturday and Sunday have more crashes occurring in the early morning hours than other days of the week. The same number of crashes also do not occur during the times people are traveling to and from work (6:00 am - 9:00 am and 3:00 to 5:00 pm) on Saturday and Sunday. This demonstrates the need for the highest portion of staff to be working overlapping shifts covering the early evening so that a high number of officers are available in the event of a crash.



Nearly one-third (30.7%) of all crashes occur in Region 3 and 23.0% of crashes occur in Region 4 (Table 3). At the same time Region 3 only employs 24.5% of Idaho State Police Troopers and Region 4 employs only 16.8% of troopers. Because of this, troopers in Regions 3 and 4 spend a much larger share of their time with crashes than troopers in other parts of the state.

Table 3. Crashes and Officers By Region

Region	Fatal Crashes		Crashes*		ISP Officers	
	N	%	N	%	N	%
1	86	11.4	26,620	13.2	27	18.9
2	79	10.4	14,008	6.9	17	11.9
3	182	24.0	61,896	30.7	35	24.5
4	204	26.9	46,340	23.0	24	16.8
5	103	13.6	27,606	13.7	20	14.0
6	103	13.6	25,116	12.5	20	14.0
Total	757	100.0	201,586	100.0	143	100.0

*includes non reportable crashes

Traffic

Region 3 has more traffic per mile of interstate than other regions (Table 4). Federal and state roadways covered by ISP within Region 3 hold 35.4% of all average daily traffic. However, although Region 2 holds only 5.8% of statewide average daily traffic, Region 2 has the highest rate of crashes per amount of traffic volume on state and federal roadways (2.6 per 1,000 cars).

Table 4. Average Traffic Per Milepost: 2006 (ISP covered State and Federal Roads)

Region	Number of mileposts	Mean traffic per milepost	Rate of crashes per 1000 cars	Total traffic per day (all mileposts in region)	
				N	%
1	535	6,193	1.1	1,269,640	18.3
2	639	2,497	2.6	404,530	5.8
3	936	8,220	1.2	2,449,510	35.4
4	734	3,840	1.1	983,050	14.2
5	662	4,258	1.0	945,230	13.7
6	1,042	3,734	1.2	862,480	12.5
Total	4,548	5,033	1.2	6,920,740	100.0
Ada	30	26,040	1.4	781,200	11.3
Canyon	75	12,823	0.8	961,700	13.9
Kootenai	65	10,693	1.2	695,020	10.0
Total	170	16,519	1.2	6,920,740	35.2

Calls for Service

Calls for service included in this study are listed in Tables 5 and 6. These particular calls were focused on to help examine the average amount of time officers take to arrive on scene after receiving orders from dispatch. This helps to exclude activity that *is* officer initiated (such as officer initiated traffic stops) from activity that is *not* (and therefore applicable to this study).

The average response time to calls for service is 18.31 minutes

Table 5. Dispatched Calls for Service* (Excluding Officer Initiated Calls) By Response Time

Calls For Service	n	%	Total Number of Calls for Service	% of total calls dispatched	Mean Response Time (in minutes)	Median Response Time (in minutes)
Property Damage Crash	2,404	21.8	3,986	60.3	19.34	13.02
Motorist Assist	2,339	21.2	23,265	10.1	17.63	12.75
Assist Other Agency	2,050	18.6	7,147	28.7	14.33	8.82
Traffic Hazard	1,322	12.0	7,078	18.7	17.61	12.58
Injury Crash	969	8.8	1,276	75.9	18.67	12.88
Abandoned Vehicle	552	5.0	7,332	7.5	20.56	10.75
General Law	539	4.9	4,263	12.6	29.59	18.17
Slide Off	306	2.8	1,222	25.0	21.25	14.67
Fire Call	161	1.5	492	32.7	13.77	9.63
Unknown Injury Crash	149	1.3	740	20.1	15.74	11.48
Fatal Crash	117	1.1	124	94.4	22.54	18.00
Hit and Run Crash	95	0.9	176	54.0	18.33	15.72
Medical Calls	24	0.2	57	42.1	18.35	11.03
HazMat	17	0.2	144	11.8	32.42	22.78
Total	11,044	100.0	57,302	19.3	18.31	12.20

*Outliers were excluded

Table 6 gives dispatched calls for service in 2006 taken from the Idaho State Police CAD system, broken up by region. Regions 3 and 1 have the highest number of dispatched calls for service.

Table 6. Number of Dispatched Calls for Service By Region

Calls For Service	1	2	3	4	5	6	Total	%
Property Damage Crash	806	222	627	207	279	283	2424	21.9
Motorist Assist	382	167	1015	265	359	151	2339	21.1
Assist Other Agency	488	222	442	227	474	206	2059	18.6
Traffic Hazard	454	107	346	88	193	136	1324	11.9
Injury Crash	304	94	241	114	112	104	969	8.7
General Law	130	42	114	70	118	85	559	5.0
Abandoned Vehicle	208	39	223	53	70	30	539	4.9
Slide Off	74	28	42	45	61	56	306	2.8
Fire Call	42	18	38	26	29	8	161	1.5
Unknown Injury Crash	55	11	14	19	29	22	150	1.4
Fatal Crash	14	15	38	18	21	11	117	1.1
Hit and Run Crash	34	5	35	13	3	6	95	0.9
Medical Calls	9	5	4	2	4	0	24	0.2
HazMat	4	0	7	3	4	0	18	0.2
Total	2964	960	3144	1142	1741	1093	11084	100.0

Response Time

All response times to crashes (crash information included all police agencies in Idaho) were studied by season, day of week and time of day to determine where ISP officers need to increase our efforts the most.

- ◆ Response times are also slowest between 3 to 5 am, however, severity of crashes in the early morning also tends to be lower (Chart 4). The time period of greatest severity of crashes is between 12:00 to 2:00 am and between 12:00 to 5:00 pm. Response times tend to reflect severity of the crash overall.
- ◆ Response times are best during Monday through Thursday but worse Friday through Sunday (Chart 5). Weekend response times are on average one minute slower than weekday (16.5 minutes compared to 15.5 minutes). This shows a greater emphasis on weekend patrol may need to be taken.

Chart 4. Response Time to Crashes By Time of Day

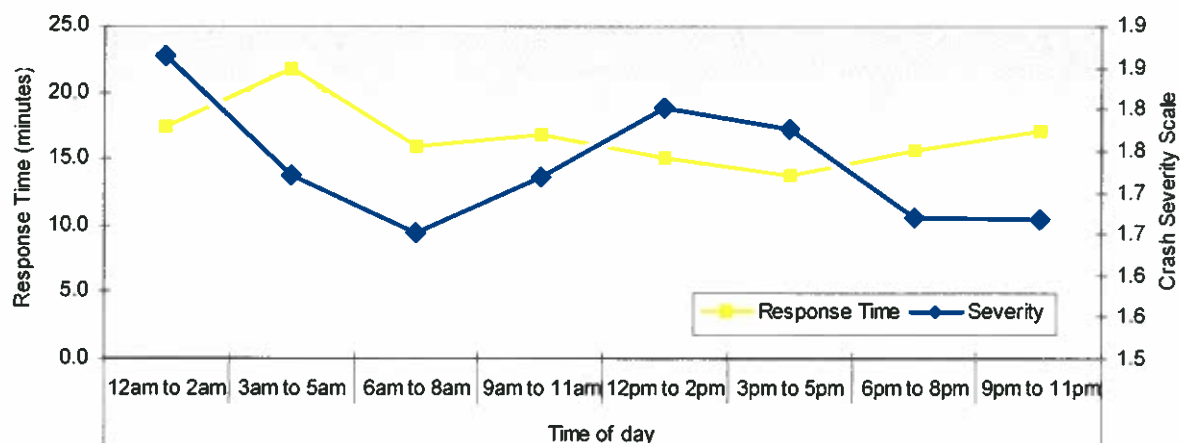
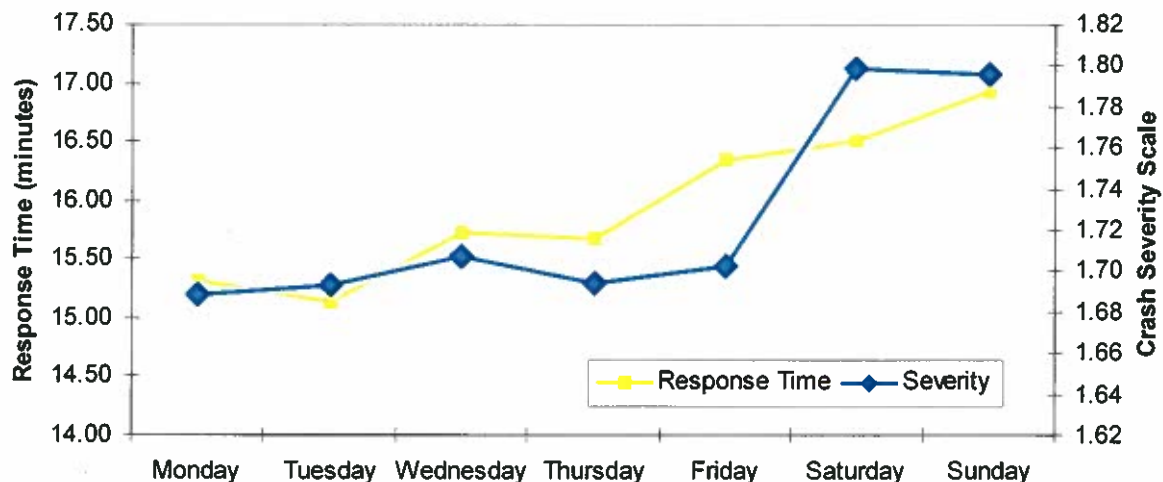


Chart 5. Response Time to Crashes By Day of Week



- ♦ Fall and Winter have slightly longer response times than Spring or Summer (15.4 minutes compared to 16.5). This is most likely due to poor driving conditions throughout most of Idaho in winter months. Troopers need to consider their own safety when responding to a crash and will not be traveling as fast in winter as other times of the year.

Table 8 shows a comparison between various regions and priority 1, 2, and 3 calls for service. Looking at calls for service for Unknown injury crash, Hit and run crash, Fatal crash, Injury crash, Slide off, Assist other agency and Motorist assist, the "On Scene" time was subtracted from the "Dispatch time." Examining this information, Region 2 had slower average response times to priority one calls, as well as average response time to all calls than other regions. This demonstrates a need in Region 2 for more troopers.

The average response time, rate of crashes and calls for service were taken into consideration when devising a weighted system and determining the appropriate number of troopers needed per region.

A chart of the average response times to injury crashes by each city is included with each regional section and was included in the final analysis of determining how many troopers were needed per region.

Table 7. Average Response Time Per Region By Priority of Call

Region	Priority	Average Minutes to Respond		n
		Mean	Median	
1	1	17.25	11.33	1403
	2	18.59	13.53	803
	3	23.57	14.15	758
	Total	19.23	12.52	2964
2	1	18.44	11.28	470
	2	33.58	24.17	231
	3	23.07	13.05	259
	Total	23.33	14.09	960
3	1	16.41	11.18	1146
	2	15.22	9.83	646
	3	16.66	11.82	1352
	Total	16.27	11.13	3144
4	1	18.64	13.17	507
	2	22.77	18.10	208
	3	27.45	20.17	427
	Total	22.68	16.35	1142
5	1	12.66	9.62	863
	2	15.32	11.38	297
	3	16.79	11.98	581
	Total	14.49	10.73	1741
6	1	15.76	10.43	467
	2	20.27	13.83	304
	3	21.71	14.41	322
	Total	18.77	12.35	1093
Total	1	16.35	10.94	4856
	2	19.27	13.08	2489
	3	20.23	13.35	3699
	Total	18.31	12.20	11044

Roads

The Idaho Transportation Department (ITD) supplied the total number of state and federal road miles within Idaho for this report. From this information, Regions 3 and 6 have the highest number of total state and federal road miles (Table 9a).

After taking crashes, traffic and calls for service into consideration, all federal and state roadway miles were split between 3 tiers depending on severity of crashes and traffic volume. After splitting the roadways into 3 groups, Region 3 not only has the highest number of road miles, it also has the highest number of tier 1 and tier 2 roads. The majority of all roadways within Idaho are Tier 3 roads, meaning they have fairly low traffic, crashes and calls for service in comparison to the other prime areas of the state.

Table 8. Total Federal and State Road Miles Per Region

Region	Federal and State Road Miles	
	N	%
1	596.07	12.0
2	695.64	14.0
3	1,028.71	20.8
4	931.74	18.8
5	708.83	14.3
6	992.47	20.0
Total	4,953.46	100.0

Number of Officers per 1000 Population

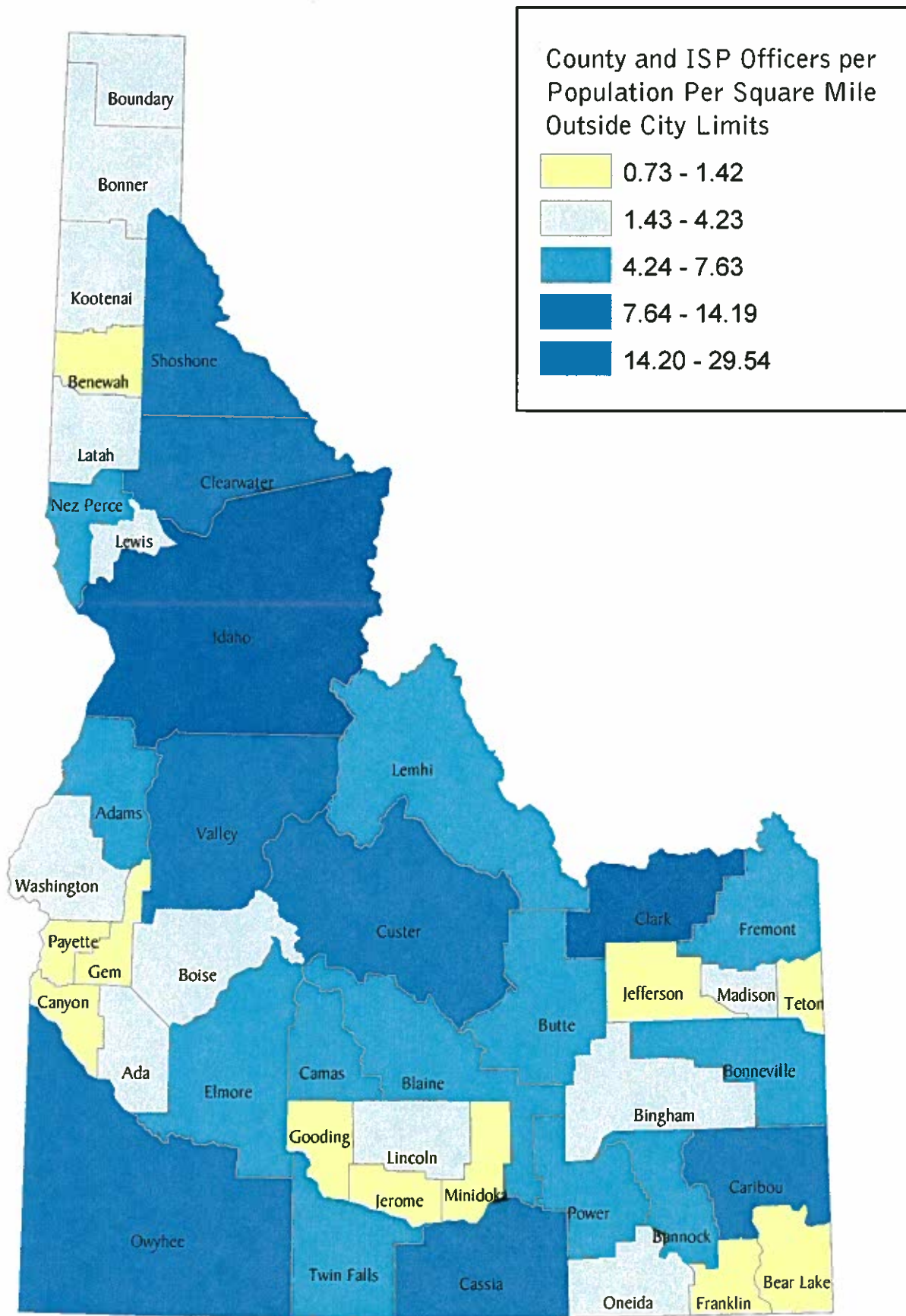
To further identify areas of greatest need for trooper coverage, a chart was generated using information gained from the Idaho State Police Crime In Idaho Book for 2006 to help estimate the total amount of trooper and county officer availability per 1000 population outside city limits. Counties with the greatest need for additional staff (taking population outside city limits into account) include Bear Lake, Lincoln, Jefferson, Bingham, Jerome and Butte Counties (all have fewer than 1.30 officers per 1000 population). Chart 6 provides a map which further defines areas of greatest need for additional troopers.

By Region, 4 has the fewest number of officers per 1000 population living outside city limits (1.94) followed by Region 1 (2.06).

Table 9. County By Number of County Officers and Number of ISP Officers Available

County	Population	Population	Population	County officers	ISP officers	Total officers	Officers per 1000 pop
		inside city limits	outside city limits				
Benewah County	9,165	3743	5,422	7	2	9	1.66
Bonner County	40,736	12760	27,976	45	4	49	1.75
Boundary County	10,563	3447	7,116	10	2	12	1.69
Kootenai County	127,722	87543	40,179	69	17	86	2.14
Shoshone County	13,038	7860	5,178	19	2	21	4.06
Region 1 Total	201,224	115,353	85,871	150	27	177	2.06
Clearwater County	8,338	4228	4,110	17	1	18	4.38
Idaho County	15,659	5772	9,887	22	5	27	2.73
Latah County	34,990	26140	8,850	25	3	28	3.16
Lewis County	3,739	2592	1,147	6	0	6	5.23
Nez Perce County	38,008	32756	5,252	21	8	29	5.52
Region 2 Total	100,734	71,488	29,246	91	17	108	3.69
Ada County	345,418	287083	58,335	139	17	156	2.67
Adams County*	3,542	1234	3,542	10	1	11	3.11
Boise County	7,440	1550	5,890	12	1	13	2.21
Canyon County	164,981	115779	49,202	71	5	76	1.54
Elmore County	28,298	13016	15,282	21	4	25	1.64
Gem County	16,265	6124	10,141	13	1	14	1.38
Owyhee County	11,037	4030	7,007	11	1	12	1.71
Payette County	22,114	13369	8,745	16	1	17	1.94
Valley County	8,310	3569	4,741	14	3	17	3.59
Washington County	10,114	5959	4,155	9	1	10	2.41
Region 3 Total	617,519	451,713	167,040	316	35	351	2.10
Blaine County	21,173	14886	6,287	16	2	18	2.86
Camas County*	1,064	392	1,064	3	0	3	2.82
Cassia County*	21,391	10558	21,391	31	8	39	1.82
Gooding County	14,424	6814	7,610	10	0	10	1.31
Jerome County	19,677	9639	10,038	12	0	12	1.20
Lincoln County*	4,532	2175	4,532	5	0	5	1.10
Minidoka County	18,996	9183	9,813	16	0	16	1.63
Twin Falls County	69,540	48708	20,832	41	14	55	2.64
Region 4 total	170,797	102,355	81,567	134	24	158	1.94
Bannock County	77,794	66954	10,840	40	13	53	4.89
Bear Lake County	6,180	385	5,795	5	1	6	1.04
Bingham County	43,775	17657	26,118	27	3	30	1.15
Caribou County	7,094	4228	2,866	15	1	16	5.58
Franklin County	12,410	6897	5,513	11	1	12	2.18
Oneida County*	4,178	2124	4,178	6	0	6	1.44
Power County	7,761	4492	3,269	10	0	10	3.06
Region 5 Total	159,192	102,737	58,579	114	19	133	2.27
Bonneville County	91,702	66450	25,252	55	15	70	2.77
Butte County*	2,782	1253	2,782	3	0.5	4	1.26
Clark County*	914	677	914	3	1	4	4.38
Custer County	4,097	1495	2,602	7	0.5	8	2.88
Fremont County	12,224	5956	6,268	19	1	20	3.19
Jefferson County	21,613	5415	16,198	18	0	18	1.11
Lemhi County	7,868	3161	4,707	6	1	7	1.49
Madison County	31,207	27744	3,463	20	0	20	5.78
Teton County*	7,494	2805	7,494	9	1	10	1.33
Region 6 Total	179,901	114,956	69,680	140	20	160	2.30
Idaho total (population covered by county agencies)	1,429,367	958,602	491,983	945	142	1,087	2.21

*No city police located in county, therefore total county population included



Commercial Vehicle Safety

Another component of Idaho State Police is the Commercial Vehicle Safety section. Information from this unit shows other valuable services ISP provides.

Commercial Vehicle Safety (CVS) Inspections are not collected in the ISP CAD system, therefore a separate collection of data was obtained through CVS. Total CVS inspections for the state of Idaho went up 32% between 2004 to 2006 (Table 10). Regions 5 and 3 have the highest average commercial vehicle inspections. Regions 6 and 4 have the lowest average inspections. Overall in 2006, Kootenai County had the highest number of inspections (1,805), followed by Bannock County (1,311).

Table 10. Commercial Vehicle Safety Inspections By County and Region Per Year

Region	County	2004	2005	2006	3 Year Average
1	Kootenai	1,036	1,177	1,805	1,339.3
	Bonner	102	54	126	94.0
	Shoshone	23	66	101	63.3
	Benewah	22	44	31	32.3
	Boundary	49	18	19	28.7
	Total	1,232	1,359	2,082	1,557.7
2	Nez Perce	806	706	996	836.0
	Idaho	573	644	474	563.7
	Latah	75	60	49	61.3
	Lewis	49	51	26	42.0
	Clearwater	45	43	25	37.7
	Total	1,548	1,504	1,570	1,540.7
3	Ada	1,419	1,029	895	1,114.3
	Canyon	179	337	219	245.0
	Owyhee	159	206	166	177.0
	Payette	35	54	72	53.7
	Elmore	38	28	47	37.7
	Adams	46	20	11	25.7
	Boise	32	16	18	22.0
	Valley	22	18	9	16.3
	Washington	23	6	12	13.7
	Gem	1	3	4	2.7
	Total	1,954	1,717	1,453	1,708.0
4	Jerome	251	465	424	380.0
	Cassia	134	317	570	340.3
	Twin Falls	158	212	192	187.3
	Minidoka	21	132	227	126.7
	Gooding	95	108	166	123.0
	Lincoln	17	31	26	24.7
	Blaine	3	35	30	22.7
	Camas	0	1	1	0.7
	Total	679	1,301	1,636	1,205.3
5	Bannock	1,260	1,112	1,311	1,227.7
	Bingham	182	155	191	176.0
	Minidoka	21	132	227	126.7
	Gooding	95	108	166	123.0
	Bear Lake	44	85	120	83.0
	Oneida	54	25	39	39.3
	Lincoln	17	31	26	24.7
	Total	1,673	1,648	2,080	1,800.3
6	Butte	71	541	844	485.3
	Bonneville	386	458	493	445.7
	Jefferson	224	296	370	296.7
	Lemhi	30	47	45	40.7
	Fremont	45	32	39	38.7
	Madison	34	26	15	25.0
	Teton	17	8	5	10.0
	Custer	5	3	12	6.7
	Clark	6	1	11	6.0
Total		818	1,412	1,834	1,354.7

Other Justifications for Additional Troopers

Currently, the national average for state troopers is approximately 29.2 officers per 100,000 population (taken from Crime in the United States: 2005 published annually by the Federal Bureau of Investigation). For the Western states listed in Table 11, the average is 27.9. Idaho has approximately 6 officers per 100,000 less than the national average. For Idaho to equal the national average, we would need to increase our force to 428.2 officers. This is 80.7% above the requested trooper allowance of 237 from this study.

Table 11. State Police Per Capita For Western States

State	Population	State patrol/police	Rate per 100,000
Washington	6,395,798	2,175	34.01
Colorado	4,753,377	966	20.32
Oregon	3,700,758	1,153	31.16
Utah	2,550,063	501	19.65
Nevada	2,495,529	796	31.90
Idaho	1,466,465	334	22.78
Montana	944,632	247	26.15
Wyoming	515,004	206	40.00

Numbers taken from Crime in the United States: 2005

Conclusions

After analysis of all tiered roads and possible routes within Idaho. It is estimated that Idaho State Police would need to hire 88 additional officers. This would allow the officers to cover all mileposts within the state based on the PAM criteria. Additional Sergeants would also be needed to supervise patrol staff. ISP currently has approximately 6.8 troopers per sergeant. If keeping with this trooper/sergeant ratio, the extra number of additional sergeants equal 13 for the 88 officers (Table 12). This number would increase the size of our force 59.8%; from 164 officers and sergeants to 265. This number is not including the extra support staff, including extra dispatch personnel, supervisors, evidence technicians, investigators, or regional communications centers that will be needed to help troopers perform their duties.

Further justification and reasoning behind regional allocation are listed in the Appendix.

It should be included that with additional troopers, the total number of calls for service will increase as the number of self-initiated activities, such as traffic stops are included in the total number of calls for service. However, in the future, the calls can be analyzed by type so all activity conducted by extra troopers can be analyzed to find the full effect of the extra officers.

Table 12. Recommended Additional Officers by Region

Region	Officers	PAM Recommended
1	27	31
2	17	18
3	35	73
4	24	40
5	20	31
6	20	38
Sergeants**	21	34
Total*	164	265

*Extra support staff will also be needed

**Sergeants were calculated at the current rate of 6.8 sergeants per trooper

Appendix:

Allocation of Troopers
and
Primary Routes Per Region

Region 1 Trooper Allocation

Region 1 is composed of Boundary, Bonner, Kootenai, Benewah and Shoshone Counties. Total population 2006 for these 5 counties equals 206,140 (Table 13). Approximately 63.8% of the region's population resides within the confines of Kootenai County.

Region 1 has many acres of national forest in the Kanisku and Coeur d'Alene National Forests. Coeur d'Alene is about 34 miles from Spokane Washington. Projected estimate of population for 2008 in Spokane Washington is 447,378, exacerbating the crime problem within Coeur d'Alene. Chart 7a depicts the number of people living per census blockgroup in region 1 per square mile. Looking at the chart, there are vast regions where less than 17.1 people are living within one square mile of each other.

Average current response times to crashes indicate that Region 1 response times are currently 3.2 minutes below the average of the state (Table 13a). Benewah County has the slowest response time to crashes for the region at an average of 25.7 minutes.

Looking at the locality of the crash by response time (Table 13b) it is apparent that agricultural area crashes in Region 1 take the longest amount of time for police officers to respond to (21.7 minutes) followed by Undeveloped and Residential areas (20.1 and 20.0 minutes)

Table 13. Population in Region 1

County	Population	%
Kootenai	131,507	63.8
Bonner	41,275	20.0
Shoshone	13,180	6.4
Boundary	10,831	5.3
Benewah	9,347	4.5
Total	206,140	100
total miles of state roads		596.07

Table 13a. Region 1 Mean Response Times By Type of Crash

County	Fatal accident	Injury Crash	Property Damage	Total
n	57	1428	2406	3891
Benewah	30.5	23.4	27.4	25.7
Bonner	27.6	20.8	18.7	19.7
Boundary	29.6	23.2	21.0	21.7
Kootenai	15.9	15.9	18.9	17.7
Shoshone	44.7	16.9	19.7	18.9
Total	23.8	18.1	19.6	19.1
Idaho	19.4	14.0	17.1	15.9

Table 13b. Region 1 Mean Response Times to Crashes By Locality of Crash

County	Agriculture	Business	Industrial	Other	Recreational	Residential	School	Undeveloped	Total
n	559	510	15	74	61	506	3	2158	3891
Bonner	18.2	15.5	0.0	10.6	14.4	27.8	0.0	19.4	19.6
Boundary	33.4	16.8	0.0	18.6	13.5	14.8	0.0	20.3	21.7
Kootenai	18.3	11.1	13.2	14.6	20.6	18.9	6.7	19.3	17.7
Shoshone	17.8	15.2	6.5	9.9	23.5	16.7	0.0	20.8	18.9
Benewah	33.1	7.1	0.0	13.0	24.0	17.2	0.0	25.1	25.7
Total	21.7	12.4	12.3	13.4	14.4	20.0	6.7	20.1	19.1
Idaho	14.0	10.3	10.0	14.5	28.2	13.7	9.6	20.2	15.9

To estimate the amount of trooper coverage needed for all regions, calls for service, average traffic and crashes were plotted by milepost. Each milepost was then given a 1, 2 or 3 rating depending on the amount of traffic, crashes and overall calls for service. The results for Region 1 are plotted on Chart 7. Major emphasis areas for Region 1 are around the cities of Coeur d'Alene, Post Falls, and Sandpoint.

In region 1, the roads were split up between 8 different routes that would need to be patrolled by troopers in order to have all mileposts covered within a 24-hour period. This estimate is on top of active duty patrolmen within the confines of the most actively needed patrolled area Coeur d'Alene.

Routes were determined by noticing connections between roads and determining routes officers could most easily take, while still being able to make it back within a reasonable amount of time to their original destination.

Currently there are 27 troopers assigned to Region 1. On average approximately 16 troopers work per day, 8 on the night shift and 8 on day (determined by averaging the total number scheduled to work, versus those taking vacation, sick leave, or out on training for the period of May 20 - June 16, 2007). In order for all roads to be covered, troopers would need to have approximately 3 hours of free time per shift, plus be assigned to the approximate zones allotted.

Table 13c. Travel Routes Within Region 1.

Route Starts in:							
1	Bonner's Ferry	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US095	506-538	32	2	64	
		US002	65-80	15	2	30	
		SH001	0-11	11	2	22	
		Total		58		116	2.11
Troopers needed: 3							
2	Sandpoint	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US002	1-39	39	2	78	
		SH057	1-37	37	2	74	
		Total				152	2.76
Troopers needed: 1							
3	Sandpoint	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US095	477-506	29	2	58	
		SH200	30-63	33	2	66	
		Total				124	2.25
Troopers needed: 3							
4	Sandpoint	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH041	18-38	20	2	40	
		US095	449-475	26	2	52	
		SH054	0-8	8	2	16	
		SH054	8-15	7	2	14	
		Total				122	2.22
Troopers needed: 2							
5	Coeur d'Alene	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US095	431-449	18	2	36	
		SH053	0-13	13	2	26	
		SH041	0-18	18	2	36	
		US090	0-12	12	2	24	
		Total				122	2.22
Troopers needed: 8							
6	Coeur d'Alene	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US090	12-21	9	2	18	
		US095	396-430	34	1	34	
		SH058	0-2	3	2	6	
		SH005	0-15	15	1	15	
		SH003	96-84	12	1	12	
		SH097	61-94	33	1	33	
		Total				118	2.14
Troopers needed: 7							
7	Kellogg	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US090	49-34	15	2	30	
		SH004	1-7	7	2	14	
		SH0003	96-117	21	2	42	
		US090	49-73	24	2	48	
		Total				134	2.44
Troopers needed: 5							
8	St Maries	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH005	0-18	18	2	36	
		US095	395-372	23	2	46	
		SH060	0-6	6	2	12	
		SH003	84-48	36	2	72	
		SH006	21-34	13	2	26	
		Total				192	3.49
Troopers needed: 2							

Using the PAM formula it was determined that 31 troopers are needed to cover all 8 routes in Region 1.

Table 13d.
Region 1 Roads

Roads	Miles
SH001	12.35
US002	44.31
SC003	0.28
SH003	69.18
SH004	6.26
SH005	19.11
SH006	14.77
SH041	39.15
SH053	14.04
SH054	15.51
SH057	37.23
SH058	2.86
SH060	5.51
IB090	3.49
IC090	0.04
IS090	1.89
IO090	73.55
UC095	0.07
US095	165.74
SH097	35.80
SB200	1.58
SH200	33.35
Total	596.07

Recommendation for Region 1:

The PAM recommended troopers for region 1 is 31. This recommendation incorporates into the number of troopers necessary to cover all existing roadways within Region 1 the increased necessary allotment based on the fact that Region 1 has lower response times and a lower police/population ratio than other parts of the state. Region 1 will need to hire 4 additional troopers to cover 8 different routes spanning 596.07 miles.

Chart 7. Tiered Road Mileposts Within Region I

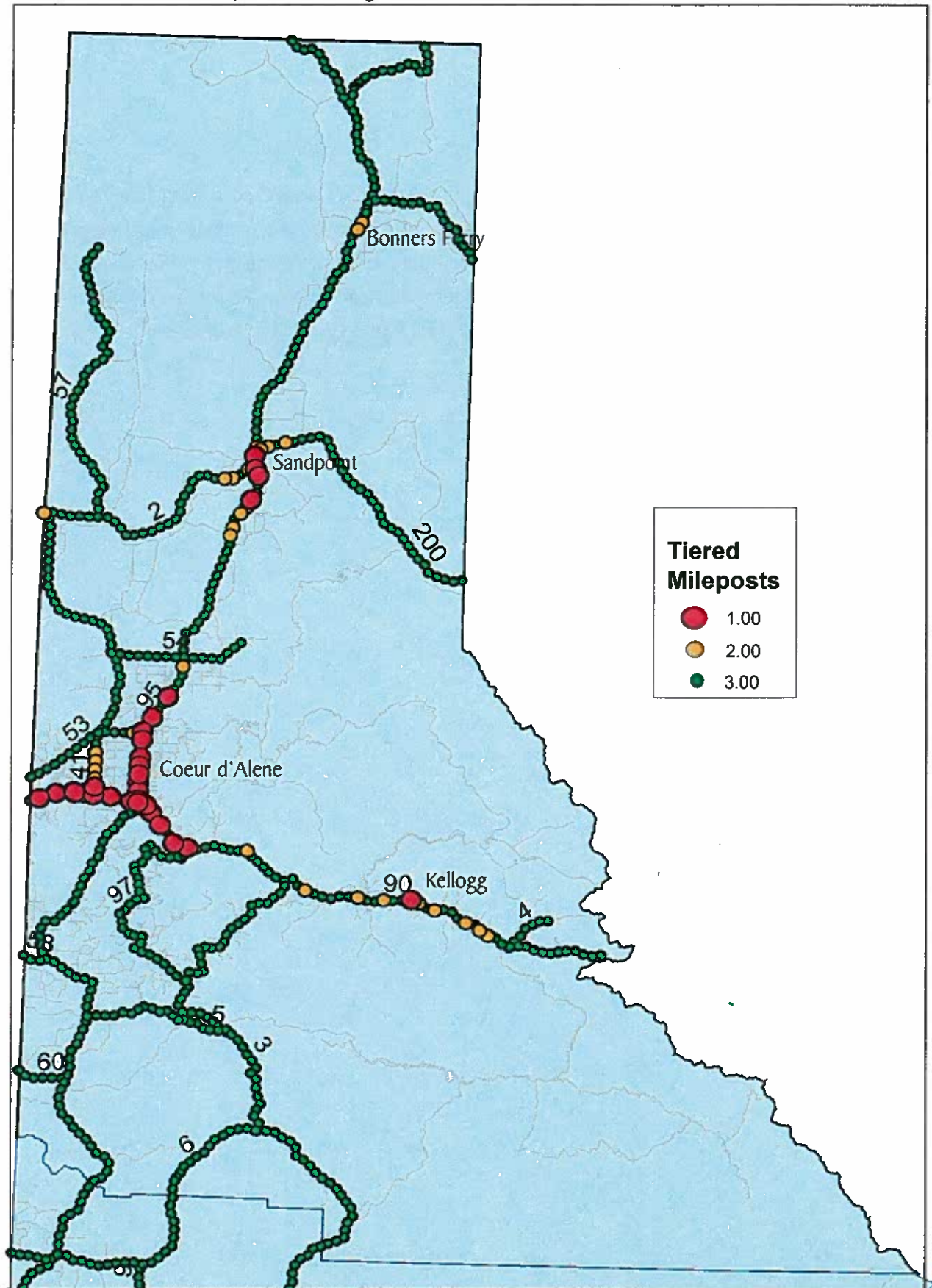


Chart 7a. Region I Population by Census BlockGroup

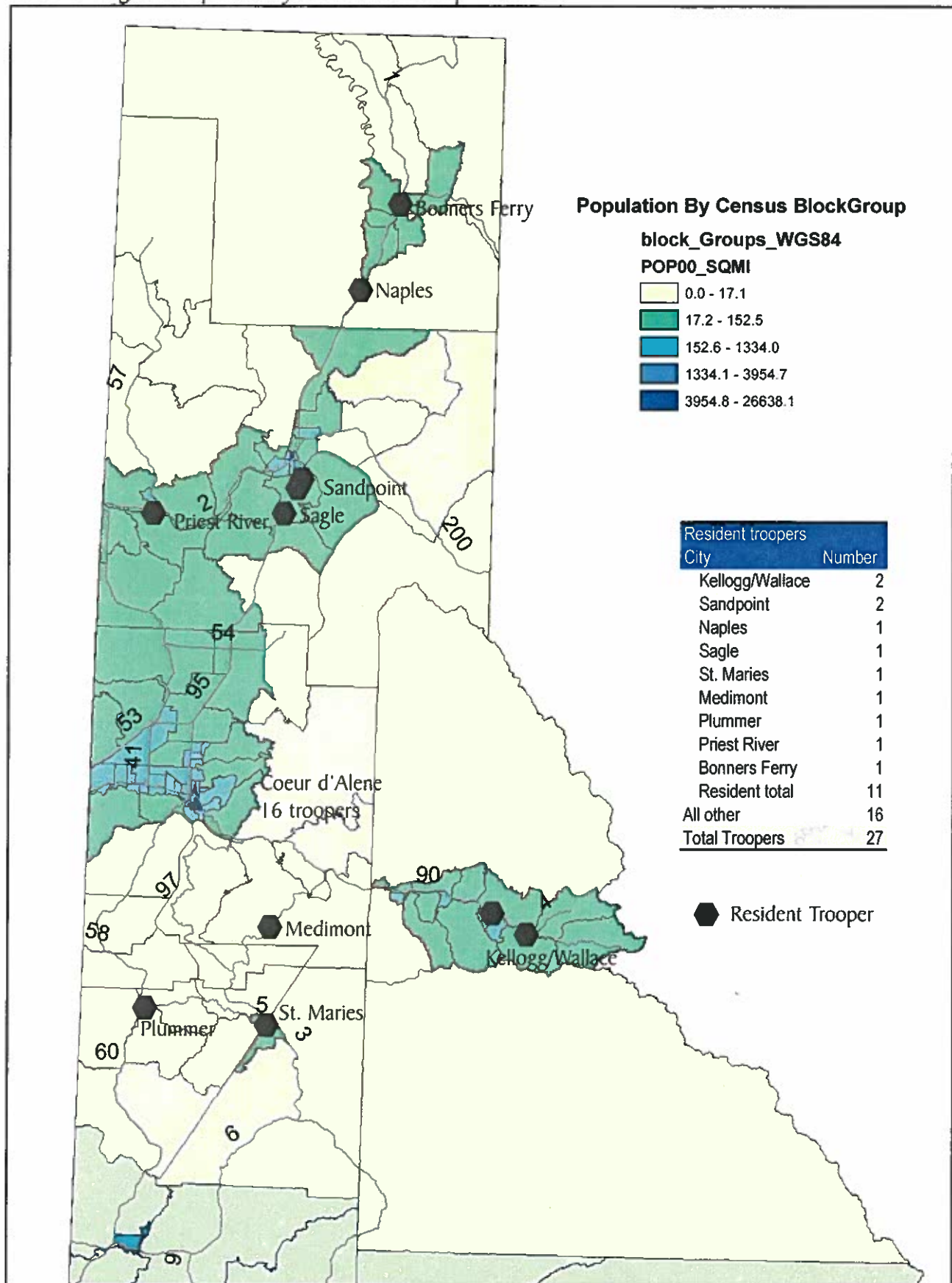
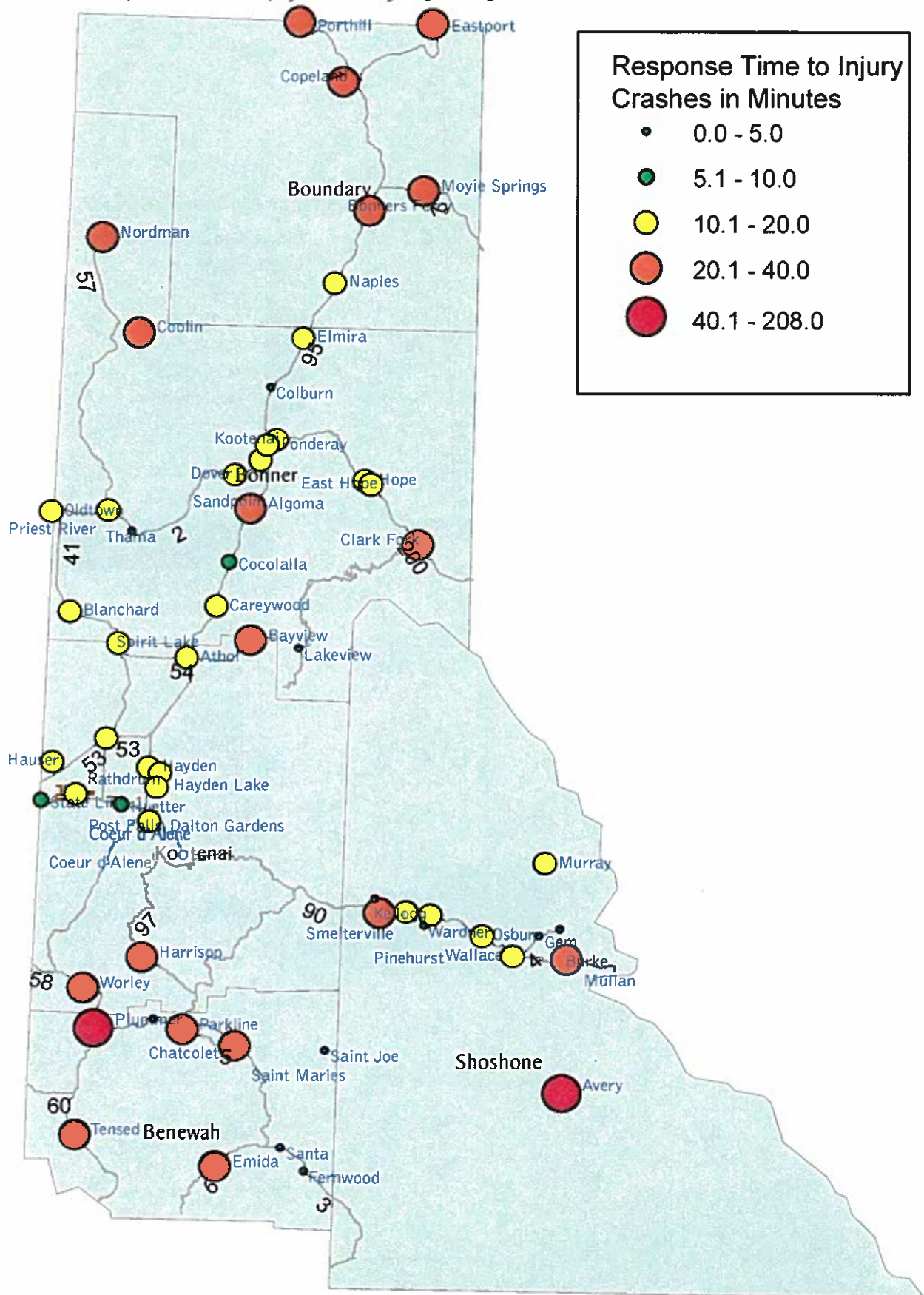


Chart 7b. Response Time to Injury Crashes By City in Region I.



Region 2 Trooper Allocation

Region 2 has Latah, Clearwater, Nez Perce, Lewis and Idaho Counties within it. Total population for 2006 was estimated to be 101,195. Latah and Nez Perce counties compose 72% of the population, even though Idaho and Clearwater counties are much larger. Clearwater National Forest and Nez Perce National Forest reside within Region 2.

Looking at the average response times to crashes within Region 2 there are large differences county by county. The highest response time, and area in apparent need of a higher allocation of troopers is Idaho county with a 32.1 minute average response time to crashes.

Response time by locality also yields different response times by county. Recreational, undeveloped and "Other" areas have the highest average response times for the region at over 27 minutes. Business and Industrial areas have the lowest average response times.

Even though response times for undeveloped and recreational areas are low, based on traffic, total number and frequency of crashes and calls for service, the areas of greatest need for trooper coverage include areas surrounding the cities of Lewiston and Moscow. Chart 8a gives a better glimpse of where the greatest population centers are within Region 2. As with most of the state of Idaho there are large sections within Region 2 that are very sparsely populated with fewer than 17.1 people living per square mile.

Table 14. Population in Region 2

Region 2	Population	% of region
Nez Perce	38,324	37.9
Latah	35,029	34.6
Idaho	15,762	15.6
Clearwater	8,324	8.2
Lewis	3,756	3.7
Total	101,195	100.0
total miles of state roads		695.6

Table 14a. Response Time to Crashes By County

County	Fatal accident	Injury Crash	Property Damage	Total
n	45	723	995	1763
Clearwater	51.0	20.8	26.0	21.4
Latah	38.0	15.3	21.8	19.4
Lewis	33.4	23.6	25.5	24.8
Idaho	28.4	28.9	35.5	32.1
Nez Perce	13.7	16.1	20.1	18.5
Region 2	19.1	20.8	29.5	23.5
Idaho Total	19.4	14.0	17.1	15.9

Table 14b. Response Time to Crashes By Locality and County

County	Agriculture	Business	Industrial	Other	Recreational	Residential	School	Undeveloped	Total
n	550	84	6	20	134	127	3	838	1763
Clearwater	34.2	7.5	10.0	27.3	22.4	21.9	-	25.4	24.0
Latah	18.1	15.9	40.0	16.0	32.3	15.8	-	22.0	19.4
Lewis	27.0	16.6	10.5	14.0	23.8	7.8	-	26.3	24.8
Idaho	23.0	15.7	18.0	35.5	28.8	27.1	15.0	37.2	32.1
Nez Perce	18.3	9.7	25.0	17.7	18.0	9.9	11.5	20.1	18.5
Region 2	20.0	12.6	13.0	27.9	27.5	19.0	19.2	27.0	23.5
Total	14.0	10.3	10.0	14.5	28.2	13.7	9.6	20.2	15.9

Region 2 roads were split up between 5 different routes. On average there are currently 7 troopers covering day and night shifts for region 2 (average number of troopers working each day between May 17 to June 14). There are 17 troopers assigned to region 2.

The total recommended allotment of troopers for Region 2 based on the PAM model of ability to cover road miles equals 18 troopers.

Recommendation for Region 2:

The PAM recommended troopers for Region 2 is 18. This recommendation incorporates into the number of troopers necessary to cover all existing roadways within Region 2 the increased necessary allotment based on the fact that Region 2 has lower response times and a lower police/population ratio than other parts of the state.

Table 14d.
Region 2
Roads

Roads	Miles
SC003	0.09
SH003	37.89
SH006	24.71
SH007	16.15
SH008	52.99
SH009	13.52
SH011	42.48
US012	168.67
SB013	0.79
SH013	26.39
SH014	49.46
SH062	15.39
SH064	15.41
SH066	0.99
UC095	0.12
USB95	7.20
USS95	0.92
US095	185.17
SH099	11.69
SH128	2.20
SS128	0.09
SH162	23.32
Total	672.32

Table 14c. Routes in Region 2

Route Starts in:							
1	Moscow	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US095	365-372	7	2	14	
		US095	346-365	19	1	19	
		SH006	11-20	10	2	20	
		SH006	0-6	6	1	6	
		SH066	0	1	2	2	
		SH009	0-13	13	1	13	
		SH008	3-24	21	1	21	
		SH008	0-3	3	2	6	
		SH003	29-48	19	2	38	
		SH008	37-53	16	2	32	
		Total				171	3.11
Troopers Needed: 4							
2	Lewiston	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US095	326-344	18	2	36	
		SH128	0-2	2	2	4	
		US012	0-2	2	2	4	
		US095	313-326	13	2	26	
		US095	305-311	6	2	12	
		SH099	0-11	11	2	22	
		SH003	13-28	15	2	30	
						134	2.44
Troopers Needed: 5							
3	Lewiston	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US095	310-303	7	2	14	
		US012	11-66	55	1	55	
		SH007	37-47	10	2	20	
		SH011	0-42	42	2	84	
		SH064	16-29	13	2	26	
		SH062	0-15	15	1	15	
		USS95	1-3	3	1	3	
		US095	280-304	24	1	24	
						241	4.38
Troopers Needed: 2							
4	Grangeville	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH013	7-26	19	2	38	
		US012	65-174	109	2	218	
		SH162	0-23	23	1	23	
		SH064	16-26	10	1	10	
						289	5.25
Troopers Needed: 3							
5	Grangeville	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH013	7-10	3	2	6	
		SH014	9-49	40	2	80	
		SH013	0-7	7	2	14	
		US095	239-171	68	2	136	
		US095	240-273	33	2	66	
						302	5.49
Troopers Needed: 4							

Chart 8. Region 2 Tiered Mileposts

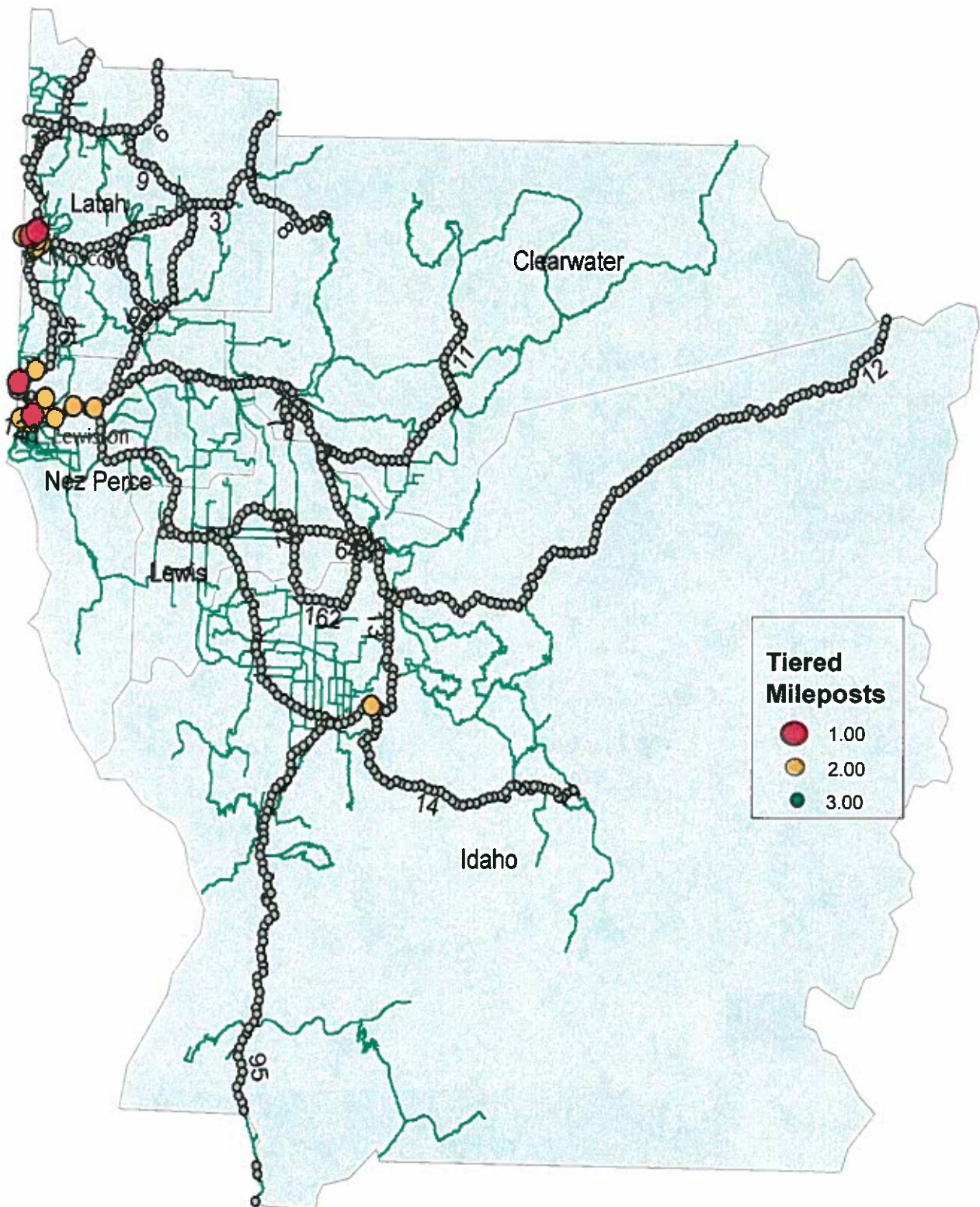
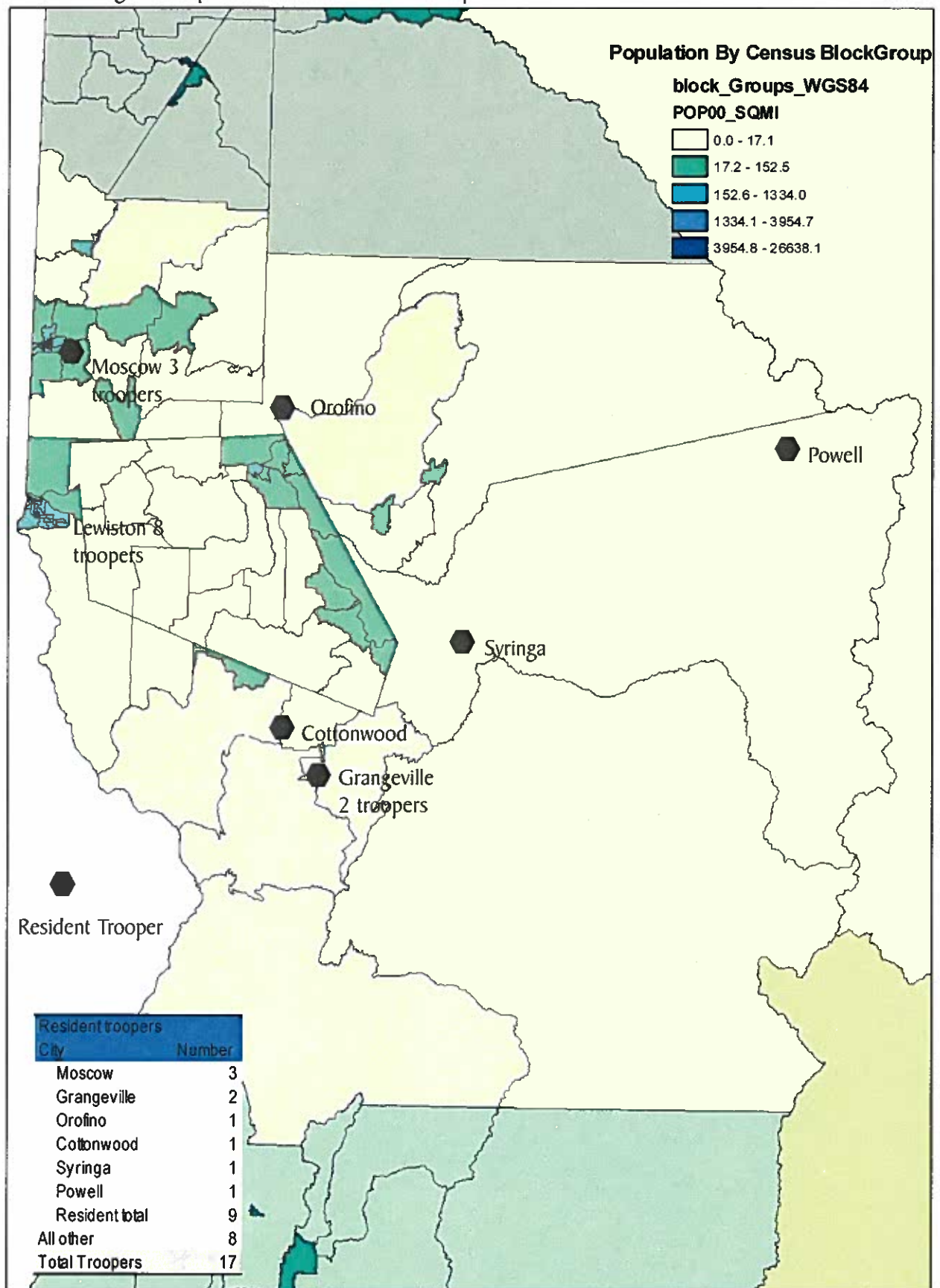


Chart 8a. Region 2 Population Per Census BlockGroup



Region 3 Trooper Allocation

Region 3 is composed of Ada, Canyon, Elmore, Payette, Gem, Owyhee, Washington, Valley, Boise, and Adams Counties. Total population for 2006 was estimated to be 640,872. Ada and Canyon counties hold 83% of the total population within the region. Boise and Payette National Forests are within Region 3.

As is apparent in Chart 9, most of the overall area within Region 3 has fewer than 17 people living within 1 square mile of each other. Therefore, the major area of emphasis for patrol coverage in Region 3 is surrounding the Boise Metropolitan Area.

Response times within Region 3 are lowest in Boise, Owyhee and Adams Counties. Localities with highest response times include recreational areas (average 33.2 minutes for region). Localities with the quickest response times include business and industrial areas (average for region is less than 10 minutes).

Routes for Region 3 were broken into 12 sections that would allow troopers to cover all mileposts, while concentrating especially upon the Boise area.

Table 15. Population in Region 3

Region 3	Population	% of region
Ada	359,035	56.0
Canyon	173,302	27.0
Elmore	28,114	4.4
Payette	22,595	3.5
Gem	16,558	2.6
Owyhee	11,104	1.7
Washington	10,202	1.6
Valley	8,836	1.4
Boise	7,641	1.2
Adams	3,485	0.5
Total	640,872	100.0
total road miles		1028.71

Table 15a. Average Response Time to Crashes

County	Fatal accident	Injury Crash	Property Damage	Total
n	151	3424	4772	8347
Ada	6.7	8.43	11.6	10.3
Adams	18.7	20.72	26.7	23.8
Boise	37.9	26.7	41.2	34.6
Canyon	14.7	8.7	10.7	10.0
Elmore	24.3	14.0	18.8	16.9
Gem	14.5	14.3	14.9	14.7
Owyhee	40.7	22.0	25.6	25.0
Payette	6.0	10.2	12.7	11.5
Valley	20.0	16.3	21.2	19.2
Washington	19.0	12.6	19.1	16.1
Region 3	20.2	11.8	15.2	13.9
Idaho	19.4	14.0	17.1	15.9

Table 15b. Average Response Time to Crashes By Locality and By County

County	Agriculture	Business	Industrial	Other	Recreational	Residential	School	Undeveloped	Total
n	550	84	6	20	134	127	3	838	1763
Ada	10.3	8.6	9.0	10.0	21.4	9.4	12.7	15.0	13.8
Adams	20.3	16.5	6.0	31.8	23.3	16.8	-	26.3	23.8
Boise	27.3	27.6	-	20.0	38.0	41.5	-	31.4	34.6
Canyon	10.0	10.5	9.9	7.8	10.1	8.9	12.0	11.0	10.0
Elmore	21.9	10.0	-	32.2	79.7	8.8	-	16.1	16.9
Gem	10.2	6.1	-	5.3	5.3	20.6	4.5	23.4	14.6
Owyhee	14.7	7.0	-	24.3	-	14.4	-	37.5	25.0
Payette	11.7	10.6	5.0	7.1	5.0	7.5	-	14.4	11.5
Valley	14.8	12.8	39.0	22.6	29.8	11.9	-	23.2	19.1
Washington	17.0	17.7	-	27.0	21.4	-	-	12.0	16.9
Region 3	11.6	9.25	9.8	15.5	33.2	11.8	11.0	19.0	13.9
Idaho	14.0	10.3	10.0	14.5	28.2	13.7	9.6	20.2	15.9

Every day within Region 3 there are currently (according to May through June schedules) an average of 14 (21.4 including motorcycle unit and Crash Unit) officers covering day and night shifts. There are 35 total troopers allotted to Region 3. In order for the 12 routes to be covered 38 additional officers would need to be added to Region 3. This includes the extra officers needed for the heavy traffic routes surrounding Boise.

Recommendations for Region 3:
Region 3 needs to hire 38 additional troopers to cover 12 different routes spanning 1028.71 miles. The PAM recommended allotment of troopers, taking into consideration average amount of traffic for the area and response times to crashes is 73.

Table 15c. Routes in Region 3

Route Starts in:						
					Trips Total	Total
		Road	Milepost	Miles	(to/from) Miles	hours
1	McCall					
		SH055	144-156	12	2	24
		US095	114-171	57	2	114
		US095	160-114	46	2	92
		SH071	0-28	28	2	56
					286	5.20
Troopers needed:		2				
2	McCall					
		SH055	64-144	80	2	160
		SH055	5	5	2	10
					170	3.09
Troopers needed:		1				
3	Payette					
		US095	68-113	45	2	90
		SH052	0-30	30	2	60
		SH072	0-1	1	2	2
		US030	22-27	5	2	10
		US095	61-68	7	2	14
		SH052	1-14	14	2	28
					218	3.96
Troopers needed:		3				
4	Payette					
		I0084	0-25	25	2	50
		US095	45-60	25	1	25
		US020	0-1	1	1	1
		US020	10-21	11	1	11
					87	1.58
Troopers needed:		6				
5	Caldwell					
		SH019	10-20	10	1	10
		SH019	0-5	5	2	10
		US095	27-38	11	1	11
		US095	39-43	8	1	8
		US095	0-26	26	2	52
		SH055	0-16	16	1	16
		I0084	56-51	5	2	10
					127	
Troopers needed:		2				
6	Nampa					
		SH055	3-16	13	1	13
		SH078	1-20	20	1	20
		SH045	11-27	16	1	16
		I0084	58-61	3	2	12
		I0084	35-46	11	2	44
		SH055	12-16	4	2	16
		I0084	40-25	15	2	30
					151	2.75
Troopers needed:		13				

Table 15d. Routes in Region 3 Continued

Route	Starts in:						
7	Boise	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH045	11-27	16	1	16	
		SH078	20-59	39	1	39	
		SH067	0-9	9	1	9	
		I0084	0-4	4	1	4	
		I0084	35-89	54	2	108	
		SH069	2-9	7	2	14	
						190	3.45
Troopers needed:		14					
8	Mountain Home	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH067	0-9	9	1	9	
		SH067	0-1	1	1	1	
		SH078	60-76	16	1	16	
		SH051	0-70	70	2	140	
		SH051	70-90	20	1	20	
						186	3.38
Troopers needed:		1					
9	Mountain Home	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH051	77-90	13	1	13	
		SH078	83-98	15	1	15	
		I0084	111-131	20	2	40	
		I0084	111-95	16	1	16	
		US020	96-136	40	1	40	
						124	2.25
Troopers needed:		7					
10	Boise	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		I0084	57-89	32	2	64	
		SH021	0-105	105	2	210	
						274	4.98
Troopers needed:		11					
11	Boise	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US020	52-55	3	2	6	
		I0084	45-55	10	2	20	
		US020	40-47	7	2	14	
		SH055	17	1	2	2	
		I0184	0-4	4	2	8	
		SH044	0-21	21	1	21	
		SH055	12-16	4	2	8	
		I0084	21-45	24	2	48	
						127	2.31
Troopers needed:		10					
12	Boise	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH055	45-64	19	1	19	
		SH052	31-54	23	1	23	
		SH016	0-13	13	2	26	
		SH044	0-11	11	1	11	
		I0084	25-10	15	1	15	
		SH052	31-28	3	1	3	
		SH072	0-1	1	1	1	
		SH052	14-30	16	1	16	
		US030	31-22	9	1	9	
		I0084	3-10	7	1	7	

Table 15e.
Region 3 Roads

Roads	Miles
SH016	13.93
SH019	16.12
SC019	0.05
USS20	0.31
US020	73.25
SH021	100.82
UC030	0.09
US030	10.26
SH044	23.09
SC044	0.29
SH045	18.05
SC045	0.25
SC051	0.09
SH051	92.58
SH052	54.13
SC055	0.22
SH055	134.36
SH067	23.68
SS067	1.47
SH069	8.07
SH071	28.73
SH072	1.99
SH078	91.96
IB084	28.00
IC084	1.51
I0084	121.19
I0184	3.62
UC095	0.39
USS95	3.43
US095	176.78
Total	1,028.71

Chart 9. Tiered Roads Within Region 3

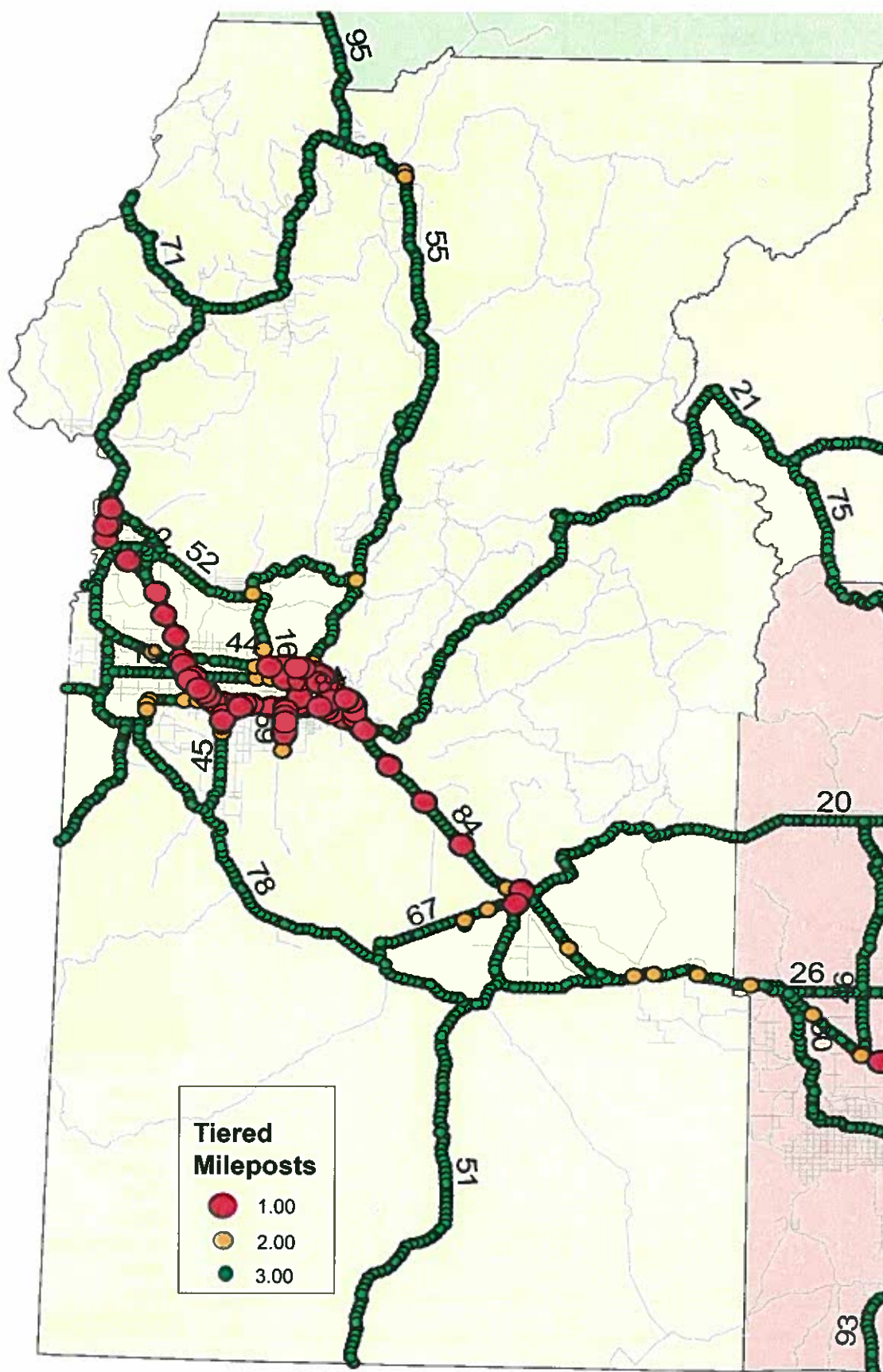
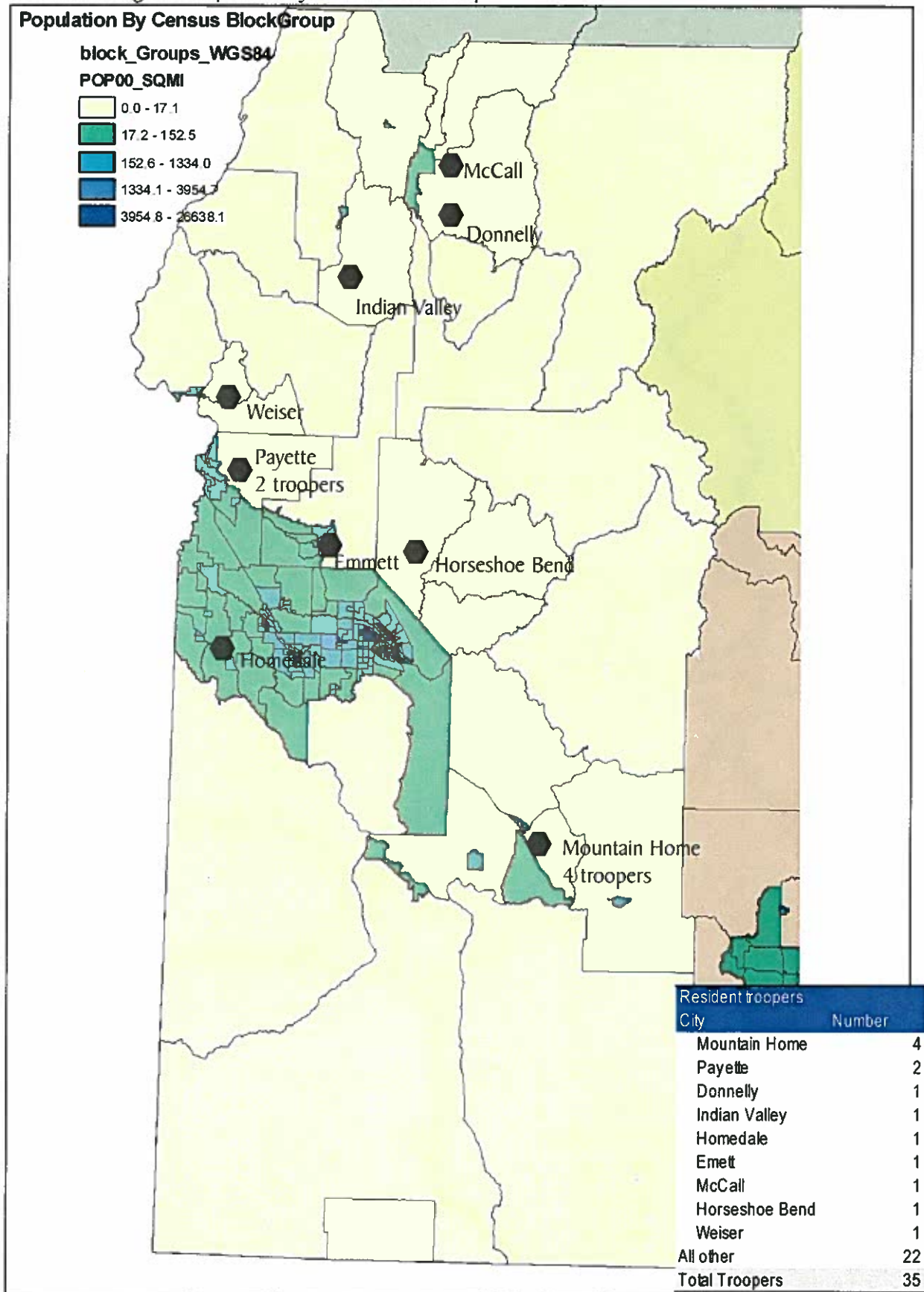


Chart 9a. Region 3 Population By Census BlockGroup





Region 4 Trooper Allocation

Region 4 is made up of Twin Falls, Blaine, Cassia, Jerome, Minidoka, Gooding, Lincoln, and Camas Counties. The total population for Region 4 was estimated to be 173,626 people in 2006. Twin Falls holds the largest population within the region (41.2% of the total population within Region 4). There are 932 total road miles the Idaho State Police is in charge of patrolling. The Sawtooth National Forest is within Region 4.

Counties within Region 4 with the slowest response time to crashes include Cassia (22.0 minutes) and Lincoln (17.0 minutes). Minidoka has the quickest response to crashes in the Region at 9.6 minutes.

Localities with the lowest response time include undeveloped (average 20.1 minutes) and recreational areas (average 19.4 minutes). Localities with the quickest response to crashes include business and industrial areas (average 9.1 minutes).

As is apparent by Chart 10a, the major areas of concern for Region 4 include the areas surrounding the cities of Twin Falls and Burley. Most parts of the region have less than 17 people living per square mile.

Table 16. Population in Region 4

Region 4	Population	% of region
Twin Falls	71,575	41.2
Blaine	21,501	12.4
Cassia	21,365	12.3
Jerome	20,130	11.6
Minidoka	19,041	11.0
Gooding	14,404	8.3
Lincoln	4,522	2.6
Camas	1,088	0.6
total population	173,626	100
total road miles		932

Table 16a. Average Response Time to Crash

County	Fatal accident	Injury Crash	Property Damage	Total
n	91	1400	1973	3464
Blaine	16.3	16.4	14.8	15.4
Camas	7.0	17.4	13.5	14.7
Cassia	24.1	19.6	23.4	22.0
Gooding	15.4	10.5	13.5	12.4
Jerome	15.6	11.1	12.2	12.2
Lincoln	21.5	16.0	17.3	17.0
Minidoka	8.8	8.7	10.5	9.6
Twin Falls	15.2	13.3	17.9	15.8
Region 4	20.2	13.5	16.5	13.9
Idaho	19.4	14.0	17.1	15.9

Table 16b. Average Minutes to Respond to Crash By Locality and By County

County	Agriculture	Business	Industrial	Other	Recreational	Residential	School	Undeveloped	Total
n	2081	249	18	62	48	148	6	850	3464
Blaine	16.9	9.3	10.0	13.6	24.8	10.9	-	17.8	15.4
Camas	14.1	-	-	-	22.3	6.0	-	19.0	14.7
Cassia	19.5	8.5	10.1	42.0	21.7	7.8	-	27.7	22.0
Gooding	11.5	7.4	10.0	4.5	14.5	19.0	-	17.0	12.4
Jerome	12.8	9.3	6.3	15.5	-	8.7	20.0	12.0	12.2
Lincoln	14.5	9.0	9.0	16.0	-	8.0	-	18.6	16.9
Minidoka	9.7	8.8	5.5	1.0	9.4	12.1	11.6	10.7	9.6
Twin Falls	15.3	9.4	9.0	5.5	16.3	10.4	-	23.5	15.8
Region 4	14.3	9.1	9.1	14.9	19.4	10.6	13.0	20.1	15.3
Idaho	14.0	10.3	10.0	14.5	28.2	13.7	9.6	20.2	15.9

The roads within Region 4 were separated into 7 different routes. On average 10 out of 26 troopers patrol region 4. At least 16 more troopers would need to be added to the ranks to be able to adequately patrol all mileposts in the area.

Recommendations for Region 4:

Region 4 will need to hire 16 additional officers to cover 931.74 miles. PAM recommended total for Region 4 is 40 troopers.

Table16c. Routes in Region 4

Route Starts in:							
1	Twin Falls	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		I0084	131-173	42	1	42	
		US093	48-52	4	1	4	
		US030	174-217	43	1	43	
		US093	0-41	41	2	82	
		SH074	0-8	8	1	8	
		US030	212-217	5	1	5	
		US026	150-141	11	1	11	
						195	3.55
Troopers needed:		6					
2	Twin Falls	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US093	48-74	26	1	26	
		US026	140-165	25	1	25	
		I0084	141-157	16	1	16	
		SH046	0-11	11	2	22	
		I0084	157-165	8	1	8	
		SH025	0-5	5	1	5	
		US093	58-48	10	1	10	
						112	2.04
Troopers needed:		4					
3	Hailey	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH075	118-172	54	2	108	
		SH075	0-3	3	2	6	
		SH074	118-74	44	2	88	
						202	3.67
Troopers needed:		2					
4	Hailey	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH075	114-102	7	2	14	
		US020	178-136	42	1	42	
		US020	136-156	20	1	20	
		SH046	43-11	32	1	32	
		US026	150-165	15	1	15	
		US093	166-204	38	1	38	
		US020	178-196	9	2	18	
		US093	204-222	18	2	36	
						229	4.16
Troopers needed:		2					
5	Twin Falls	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH025	0-30	30	1	30	
		US030	218-223	5	1	5	
		SH050	0-8	8	1	8	
		I0084	165-200	35	1	35	
		SH025	38-51	14	1	14	
		SH024	3-68	15	1	15	
		US093	48-73	25	1	25	
						132	2.40
Troopers needed:		5					

Table 16d. Routes in Region 4 Continued

Route	Starts in:						
		Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
6	Burley						
		SH027	0-23	23	2	46	
		US030	224-258	34	1	34	
		SH050	0-5	5	1	5	
		I0084	182-216	34	1	34	
		SH077	0-30	30	1	30	
		SH081	0-33	33	1	33	
						182	3.31
Troopers needed:		5					
7	Burley						
		US030	258-261	3	1	3	
		I0084	211-261	50	2	100	
		I0086	0-17	17	2	34	
Troopers needed:		16				137	2.49

Table 16e.
Region 4 Roads

Roads	Miles
US020	71.36
SH021	25.35
SH024	67.21
SH025	49.55
US026	26.96
SH027	24.26
US030	81.22
UC030	0.30
SH046	42.54
SS046	1.19
SC050	0.14
SH050	8.09
SC074	0.14
SH074	7.87
SH075	143.45
SS075	3.60
SH077	30.41
SH079	2.56
SS081	0.34
SH081	33.98
IB084	10.13
I0084	154.56
I0086	14.81
UC093	0.20
USS93	1.16
US093	130.36
Total	931.74

Chart 10. Tiered Mileposts

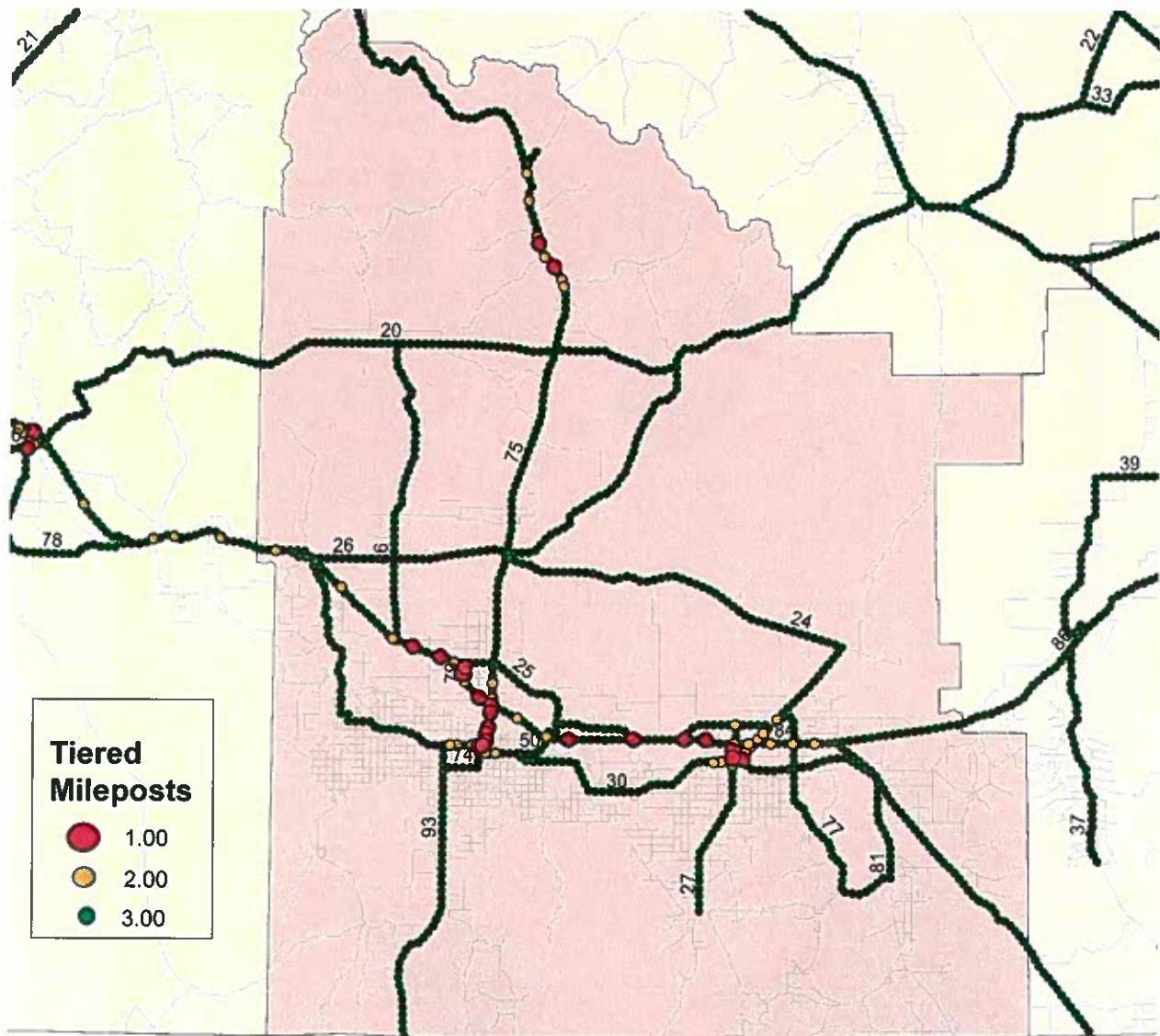


Chart 10a. Population Within Region 4 By Census BlockGroup

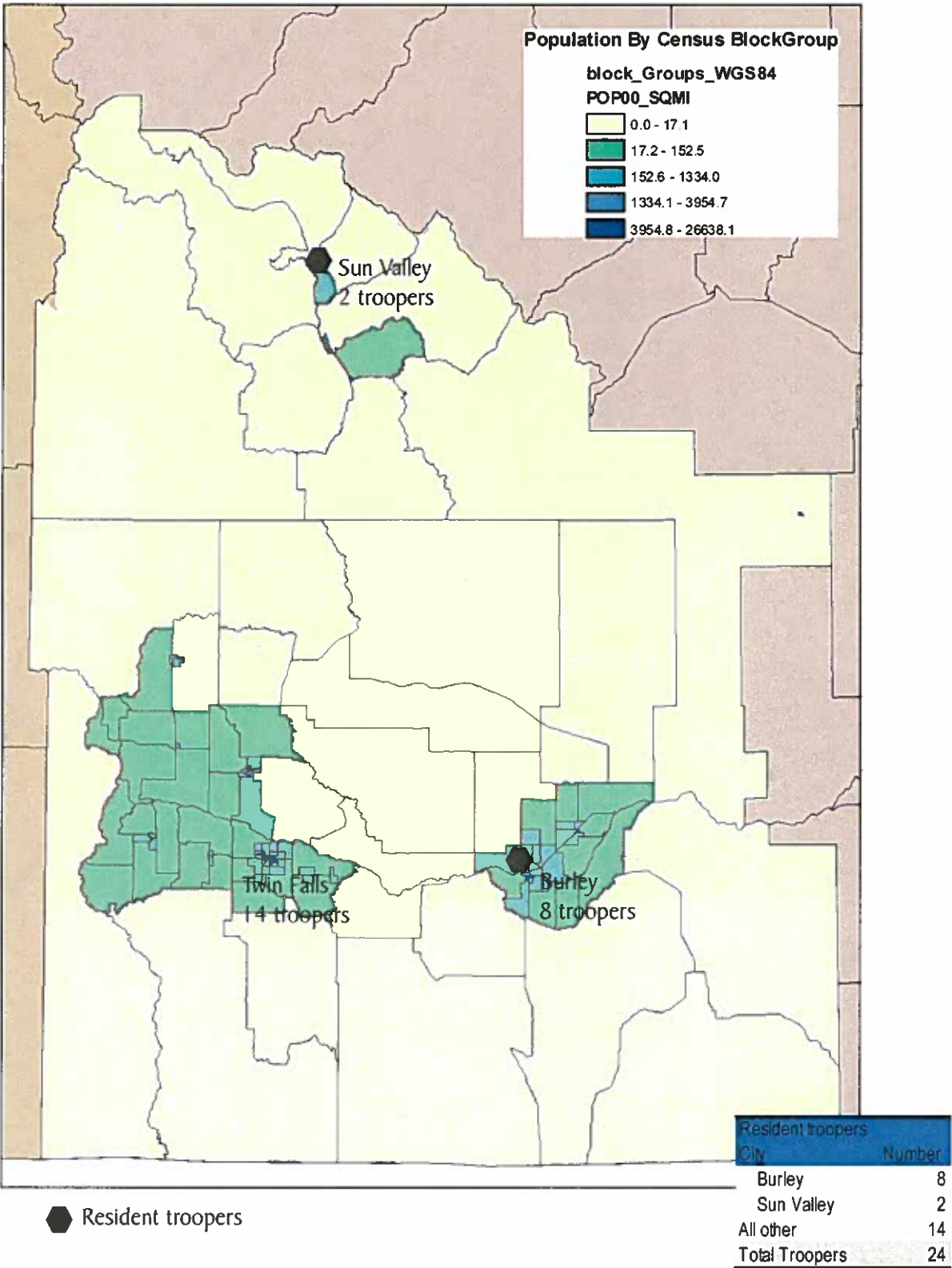
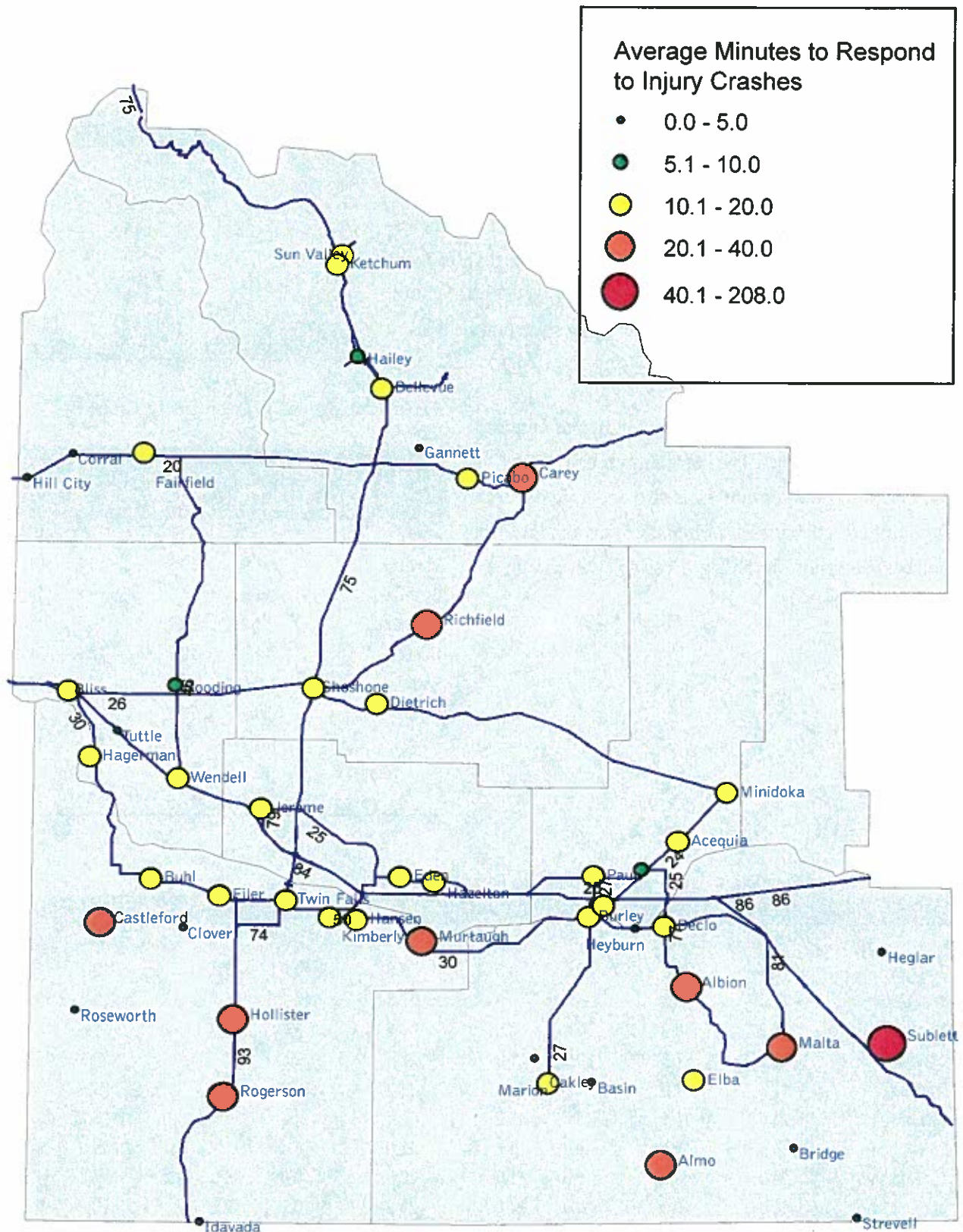


Chart 10b. Average Minutes to Respond to Injury Crash By City



Region 5 Trooper Allocation

Region 5 has Bannock, Bingham, Franklin, Power, Caribou, Bear Lake, and Oneida Counties within it. The total population for Region 5 in 2006 was 160,241. Bannock and Bingham Counties hold 76.4% of the total population within the region.

Counties with the slowest response time include Oneida and Caribou (average 23.9 and 21.4 minutes respectively to crashes). Both are very rural counties. Bingham and Bannock Counties have the quickest response times to crashes at less than 12 minutes. Recreational and undeveloped localities have the longest response times (20.0 minutes and 16.2 minutes respectively). School, industrial and business areas have the quickest response times at 9.0 minutes or less.

The major city and therefore the major area of emphasis in region 5 is Pocatello. The corridor between Idaho Falls and Pocatello on Interstate 15 is also an important area. The northern I-15 stretch of Region 5 has the Fort Hall Indian Reservation, including a casino where there are extra traffic concerns.

Table 17. Population in Region 5

Region 5	Population	% of region
Bannock	78,443	48.95
Bingham	44,051	27.49
Franklin	12,494	7.80
Power	7,914	4.94
Caribou	6,996	4.37
Bear Lake	6,167	3.85
Oneida	4,176	2.61
total population	160,241	100.00
total road miles		708.83

Table 17a. Minutes to Respond To Crash By County

County	Fatal accident	Injury Crash	Property Damage	Total
n	74	1177	1983	3234
Bannock	11.9	10.3	12.9	11.9
Bear Lake	11.3	14.5	19.8	17.7
Bingham	12.8	8.9	12.5	11.2
Caribou	16.6	19.2	23.9	21.4
Franklin	6.8	11.1	17.3	14.2
Oneida	30.8	23.5	23.7	23.9
Power	15.0	11.5	16.2	14.5
Region 5	15.8	12.1	16.5	14.2
Idaho	19.4	14.0	17.1	15.9

Table 17b. Locality of Crash by Average Minutes to Respond and By County

County	Agriculture	Business	Industrial	Other	Recreational	Residential	School	Undeveloped	Total
n	1658	228	24	18	36	159	4	1106	3234
Bannock	13.6	8.6	9.3	8.3	9.3	8.8	5.0	12.3	11.9
Bear Lake	17.0	10.3	-	-	17.3	17.1	-	20.8	17.7
Bingham	11.3	8.0	6.8	3.5	7.9	8.6	9.0	13.4	11.2
Caribou	20.3	7.8	16.0	1.0	28.5	9.5	-	25.3	21.4
Franklin	12.3	6.0	-	17.5	31.3	20.3	-	24.5	14.2
Oneida	24.5	13.1	-	13.2	-	4.5	-	25.7	23.9
Power	14.5	9.4	8.0	9.7	21.0	26.5	-	15.5	14.5
Region 5	14.0	9.0	8.3	11.0	20.0	9.8	8.0	16.2	14.2
Idaho	14.0	10.3	10.0	14.5	28.2	13.7	9.6	20.2	15.9

Region 5 was broken up into six major highway/interstate routes. Currently an average of 15 troopers cover morning and evening shifts in Region 5. In order for the freeway miles to be covered adequately an additional 11 troopers need be added to the region.

Recommendations for Region 5:

Region 5 will need to hire 11 additional troopers to cover 708.83 miles. PAM recommendation of troopers for Region 5 is 31.

Table 17d.
Region 5 Roads

Roads	Miles
IB015	18.81
IO015	111.86
US026	34.10
US030	88.99
USB30	0.45
SH034	98.41
SH036	67.04
SH037	31.23
SH038	23.41
SH039	52.34
SC039	0.09
SH040	2.74
SH061	0.74
IB086	5.43
IO086	48.04
UC089	0.06
US089	43.47
UC091	0.07
US091	81.55
Total	708.83

Table 17c. Routes in Region 5

Route	Starts in:						
1	American Falls	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		IO086	17-61	44	1	44	
		SH037	38-68	30	1	30	
		SH039	0-52	52	1	52	
		US091	81-97	16	1	16	
		IO086	0-2	2	1	2	
		IO086	40-61	21	1	21	
						165	3.00
Troopers needed:		9					
2	Pocatello	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		IO086	57-62	5	1	5	
		IO015	72-48	24	1	24	
		US091	41-10	31	1	31	
		SH040	2	2	1	2	
		SH034	8-50	42	1	42	
		US030	385-360	25	1	25	
						129	2.35
Troopers needed:		4					
3	Malad	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH038	0-23	23	2	46	
		IO015	13-33	20	2	40	
		IO015	0-13	13	2	26	
		SH036	101-131	30	2	60	
		US091	0-8	8	2	16	
						188	3.42
Troopers needed:		9					
4	Soda Springs	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH034	58-113	55	2	110	
		US030	385-455	70	1	70	
						180	3.27
Troopers needed:		2					
5	Preston	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US089	20-0	20	2	40	
		US089	20-41	21	2	42	
		IB086	0-4	4	2	8	
		SH036	0-33	33	2	66	
						156	2.84
Troopers needed:		2					
6	Pocatello	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		IB015	93-112	19	2	38	
		US091	121-100	21	1	21	
		US026	305-276	29	1	29	
						126	2.29
Troopers needed:		5					

Chart 11a. Region 5 Population By Census BlockGroup

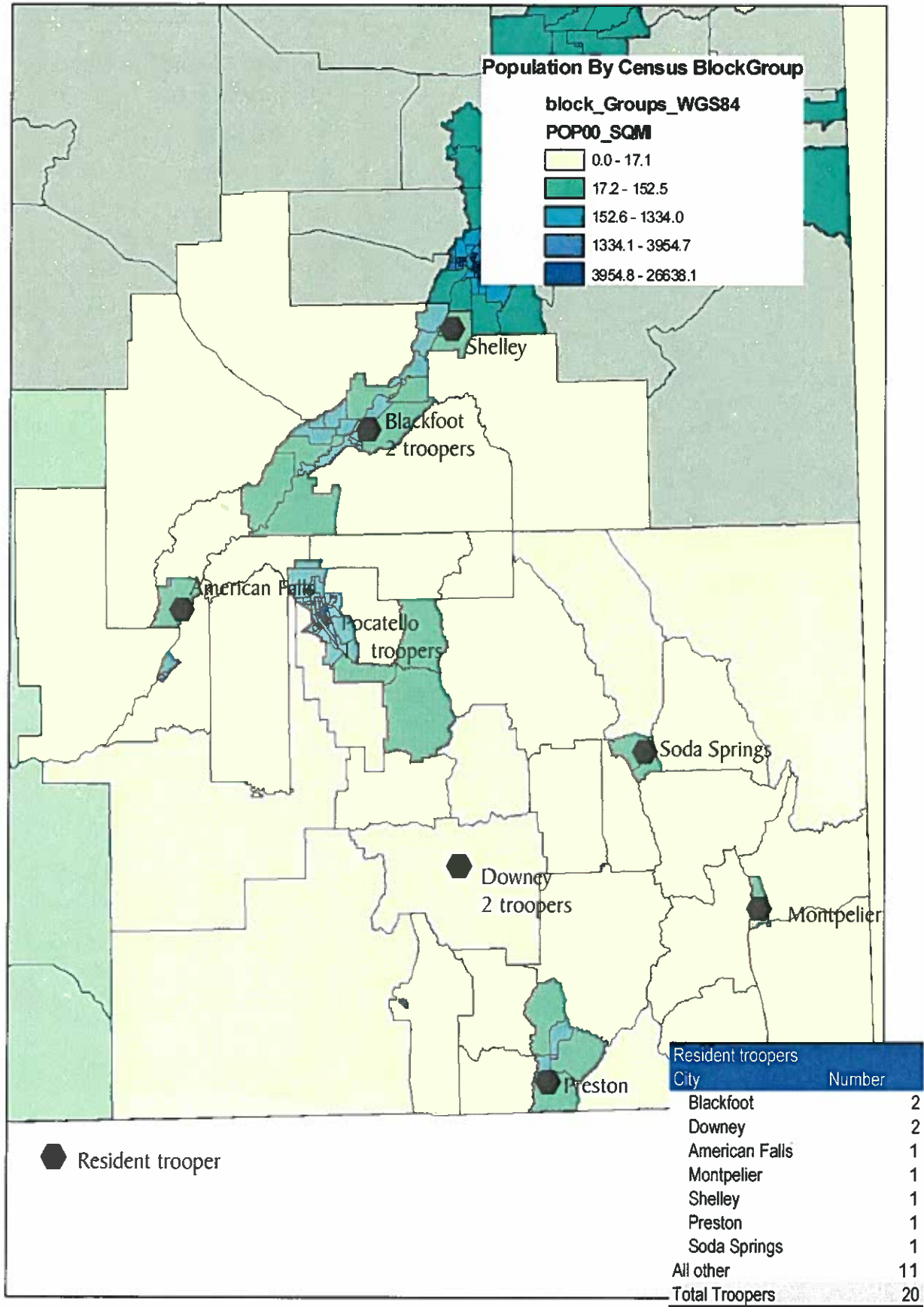
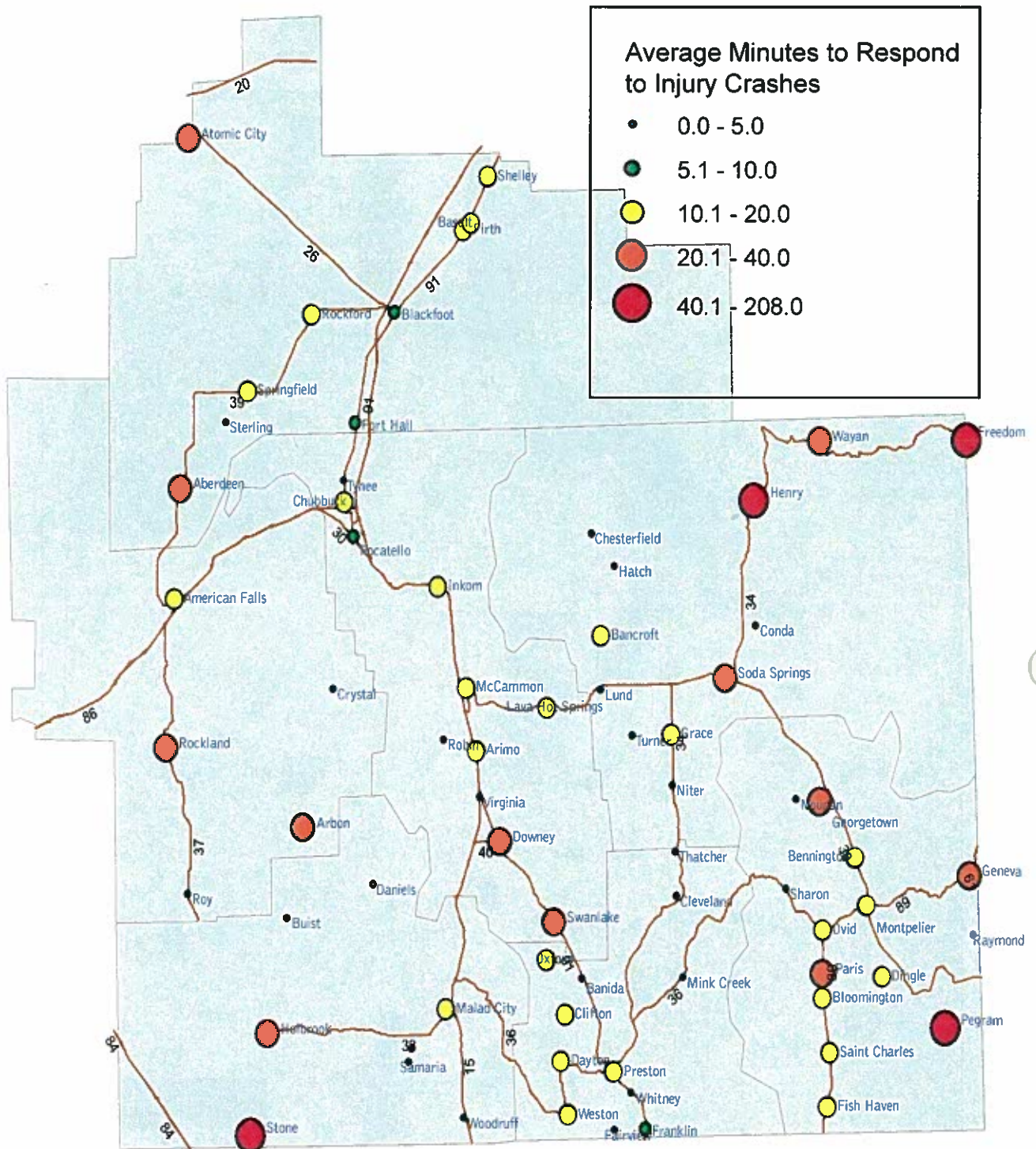


Chart 11b. Region 5 Average Minutes To Respond to Injury Crash By City



Region 6 Trooper Allocation

Bonneville, Madison, Jefferson, Fremont, Lemhi, Teton, Custer, Butte, and Clark Counties compose Region 6. Total population for the region in 2006 was estimated to be 184,391 people. Bonneville County holds slightly over half of the total population within the region (51.3%).

Counties with the slowest response times to crashes include Lemhi, Clark and Custer (average 31.0, 26.2 and 21.7 minutes respectively). Quickest response to crashes occur in Madison, Teton and Jefferson Counties (average 9.7, 11.1, and 12.6 minutes respectively).

Localities with the slowest response times to crashes include recreational and undeveloped areas (average 28.2 and 20.2 minutes). Fastest response occurs in school, industrial, and business areas (average 9.6, 10.0 and 10.3 minutes respectively).

The great majority of the area in Region 6 only has 17.1 people per square mile. The population base resides mostly within Idaho Falls and north to the St. Anthony area.

Table 18. Population of Region 6

Region 6 Population % of region		
Bonneville	94,630	51.32
Madison	31,393	17.03
Jefferson	22,350	12.12
Fremont	12,369	6.71
Lemhi	7,930	4.30
Teton	7,838	4.25
Custer	4,180	2.27
Butte	2,781	1.51
Clark	920	0.50
Total	184,391	100.00
road miles		992

Table 18a. Average Minutes To Respond To Crash by County

County	Fatal accident	Injury Crash	Property Damage	Total
n	67	1118	1949	3134
Bonneville	8.9	11.0	16.1	14.2
Butte	25.0	15.4	17.2	16.8
Clark	15.5	20.2	28.4	26.2
Custer	86.3	19.2	19.4	21.7
Fremont	12.8	14.0	20.7	18.1
Lemhi	28.9	30.2	31.6	31.0
Jefferson	10.5	10.8	13.7	12.6
Madison	8.2	9.2	10.0	9.7
Teton	11.5	9.8	11.6	11.1
Region 6	18.0	13.6	17.0	15.8
Idaho	19.4	14.0	17.1	15.9

Table 18b. Average Minutes to Respond to Crash By Locality and By County

County	Agriculture	Business	Industrial	Other	Recreational	Residential	School	Undeveloped	Total
n	1290	536	12	38	225	325	5	703	3134
Bonneville	12.8	11.9	9.0	12.9	31.0	10.6	5.0	23.4	14.2
Butte	12.4	5.0	-	-	-	27.0	-	17.8	16.8
Clark	21.0	23.6	-	-	70.0	-	-	27.0	26.2
Custer	17.6	13.6	-	16.5	28.1	7.0	-	33.4	21.7
Fremont	11.7	24.3	3.0	5.8	23.7	18.5	-	15.8	18.1
Lemhi	31.3	8.8	-	-	32.9	14.7	-	32.6	30.8
Jefferson	13.5	7.8	7.5	6.0	7.3	8.8	1.5	16.5	12.6
Madison	10.1	8.5	-	15.6	6.7	8.2	-	11.2	9.7
Teton	11.7	7.7	-	-	31.8	11.2	-	11.1	11.1
Region 6	13.5	12.1	8.3	13.2	26.7	10.6	3.6	22.1	15.8
Idaho	14.0	10.3	10.0	14.5	28.2	13.7	9.6	20.2	15.9

Region 6 was broken into 9 different highway/freeway routes. On average there are approximately 9.5 officers patrolling Region 6 on a daily basis. In order to cover all the mileposts adequately, an additional 18 troopers would need to be added. The interesting part about this region, however, is that the emphasis will be more a factor of needing troopers to travel all the necessary miles, versus needing troopers because of an increase in crime.

Recommendations for Region 6:

Region 6 will need to hire 18 additional officers to cover 992.47 road miles. PAM recommendation of total troopers for Region 6 is 38.

Table 18c. Routes in Region 6

Route		Starts in:					
1	Salmon	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		IB015	0-1	1	1	1	
		I0015	305-350	45	2	90	
		US093	304-280	24	2	48	
		SH028	135-91	44	2	88	
		SH029	0-13	13	2	26	
						153	2.78
Troopers needed:		12					
2	Challis	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US093	243-280	37	2	74	
		SH075	243-172	71	2	142	
		SH022	106-130	24	2	48	
		US093	160-131	29	2	58	
						322	5.85
Troopers needed:		3					
3	Arco	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		US093	130-83	47	2	94	
		US020	222-276	54	2	108	
		US026	267-269	2	2	4	
		SH033	0-24	24	2	48	
						254	4.62
Troopers needed:		2					
4	Mud Lake	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		SH033	44-25	19	1	19	
		SH022	26-38	12	1	12	
		SH028	31-90	59	2	118	
		SH028	30-16	14	1	14	
						163	2.96
Troopers needed:		1					
5	Roberts	Road	Milepost	Miles	Trips (to/from)	Total Miles	Total hours
		I0015	135-196	61	1	61	
		I0015	196-167	29	1	29	
		SH022	68-38	30	1	30	
		SH028	31-15	16	1	16	
		SH033	44-58	14	1	14	
		I0015	134-143	9	1	9	
		SH033	59-78	19	2	38	
						197	3.58
Troopers needed:		13					

Table 18d. Routes in Region 6 Cont.

Trooper Program Data							
Route	Starts in:						
	St.				Trips	Total	Total
		Road	Milepost	Miles	(to/from)	Miles	hours
6	Anthony	US020	333-406	73	2	146	
		SH087	0-9	9	2	18	
						164	2.98
Troopers needed:		1					
	St.				Trips	Total	Total
		Road	Milepost	Miles	(to/from)	Miles	hours
7	Anthony	US020	332-339	7	1	7	
		SH033	100-130	30	1	30	
		SH032	0-28	28	1	28	
		SH047	0-12	12	2	24	
		US020	360-340	20	1	20	
		SH033	131-149	18	2	36	
Troopers needed:		1					
						145	2.64
		Road	Milepost	Miles	Trips	Total	Total
					(to/from)	Miles	hours
8	Driggs	SH033	150-136	14	2	28	
		SH033	150-155	5	2	10	
		SH031	0-21	21	2	42	
		US026	377-402	25	2	50	
						130	2.36
Troopers needed:		1					
	Idaho				Trips	Total	Total
	Falls	Road	Milepost	Miles	(to/from)	Miles	hours
9		US026	377-347	30	2	60	
		IB0015	0-16	16	2	32	
Troopers needed:		4					
						92	1.67

Table 18e.
Roads in
Region 6

Roads	Miles
IB015	4.28
IO015	84.14
USB20	7.53
UC020	0.13
US020	164.51
SH022	43.94
UC026	0.16
USB26	2.97
US026	67.55
SC028	0.16
SH028	120.50
SH029	13.61
SH031	21.02
SH032	28.39
SH033	139.76
SS033	0.67
SH043	3.86
SC043	0.16
SH047	12.42
SH048	24.41
SH075	27.22
SH087	9.15
US091	4.51
UC093	0.05
USS93	1.41
US093	209.96
Total	992.47

Chart 12. Region 6 Tiered Mileposts

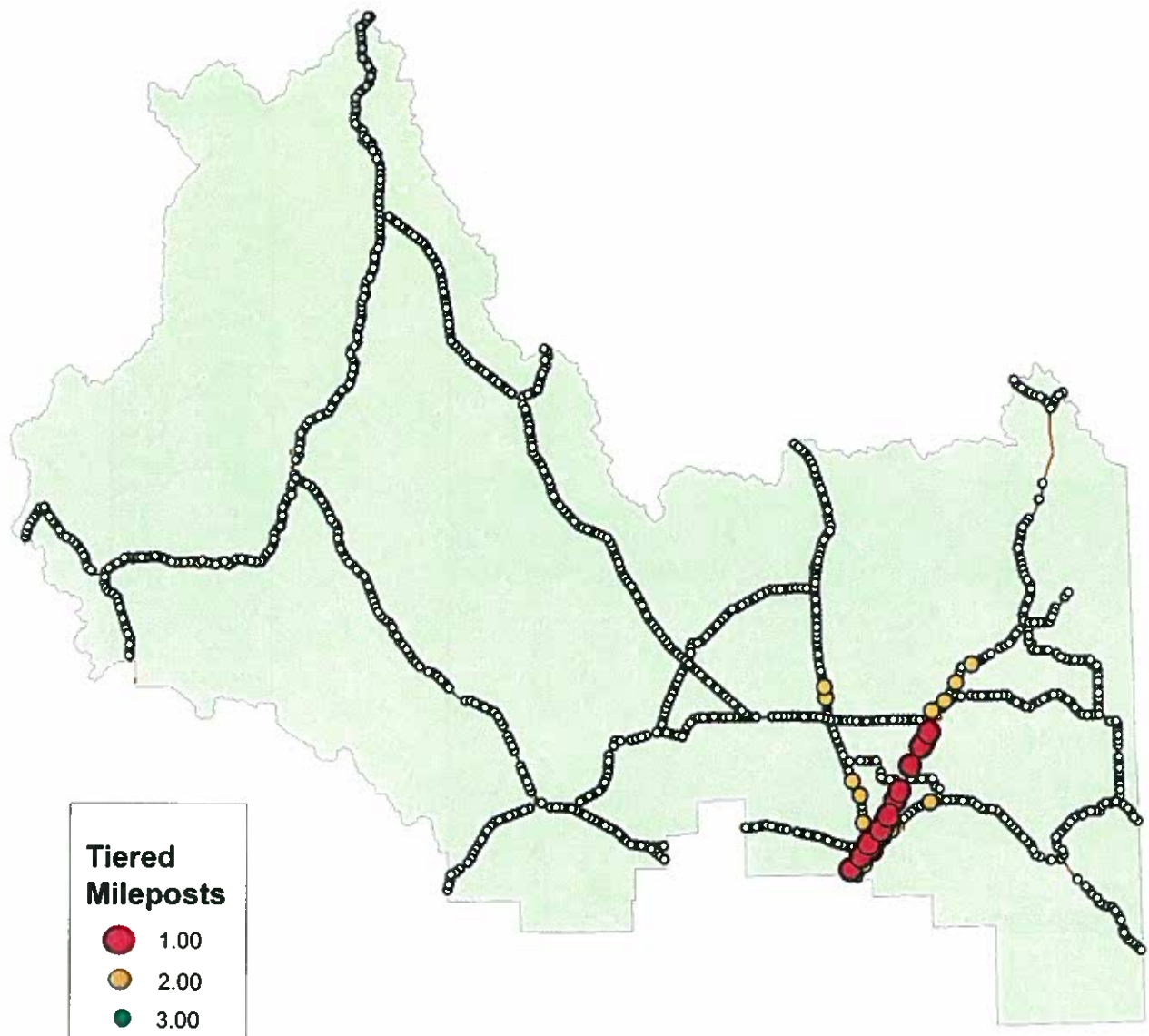


Chart 12a. Region 6 Population Per Census BlockGroup

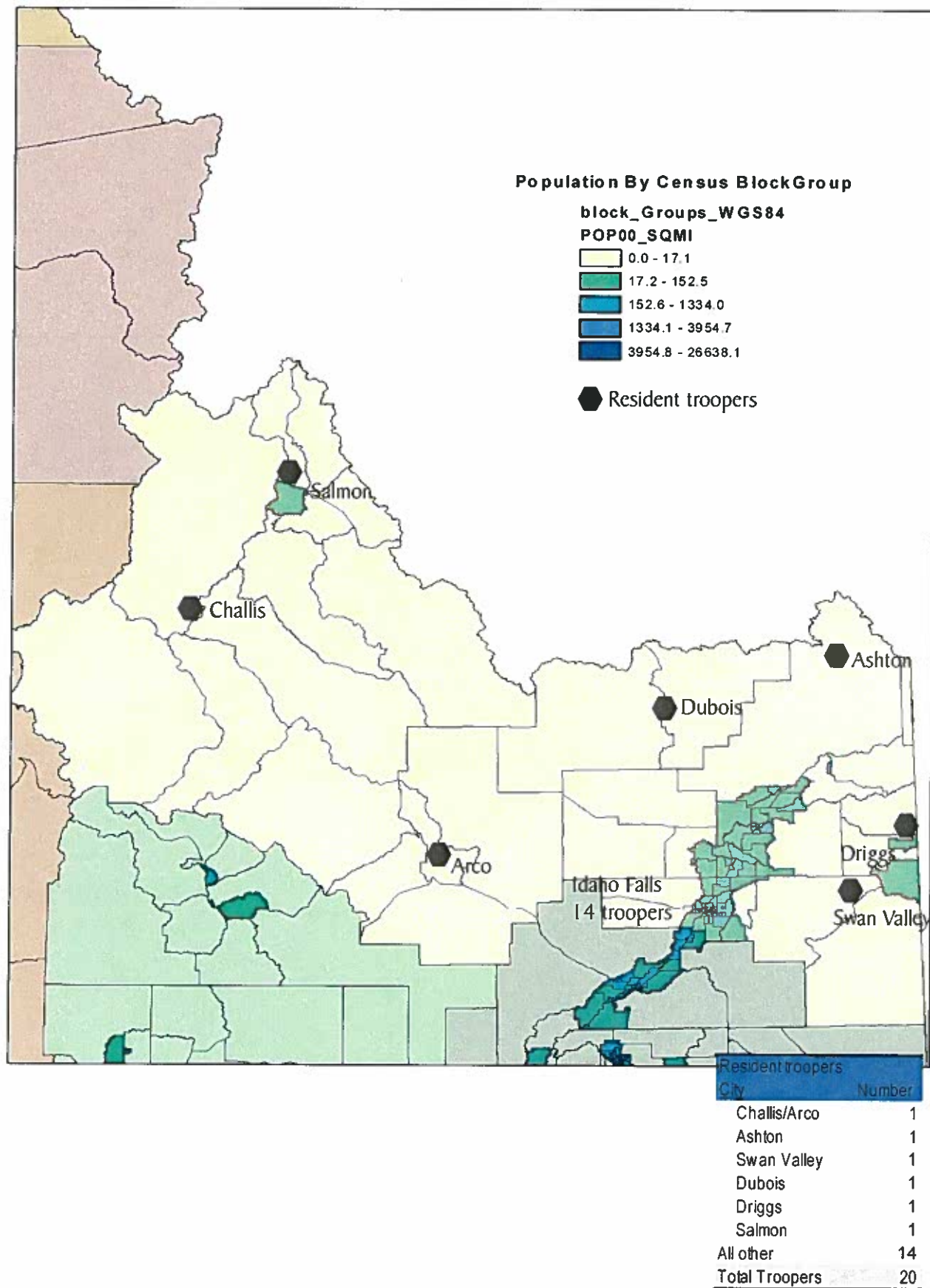
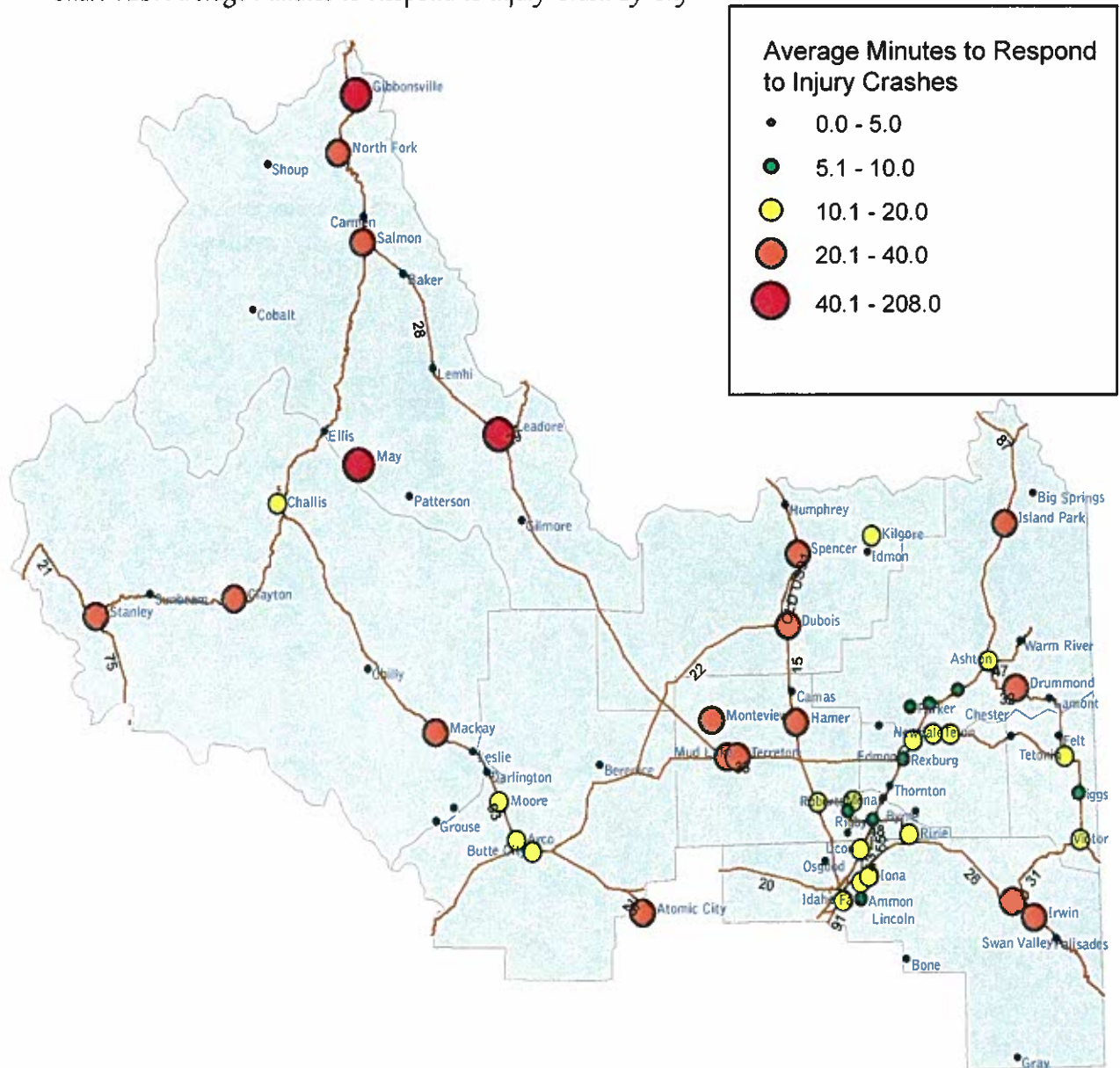


Chart 12b. Average Minutes to Respond to Injury Crash By City



Recommendations

This study was hampered by the quality of data available from the Idaho State Police CAD system. In order to more accurately measure the response time to calls for service, as well as the amount of unobligated time per trooper it is recommended that a new system be devised that is able to more accurately track various calls for service and their location, as well as response time by troopers, and unobligated time. If better data collection were in place, changes made by ISP in regards to patrolling all mileposts every 24 hours could be systematically tracked and evaluated for overall effectiveness.

